1979

Biodata determinants of vocational typology

Bruce Jerome Eberhardt
Iowa State University

INFORMATION TO USERS

This was produced from a copy of a document sent to us for microfilming. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help you understand markings or notations which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure you of complete continuity.

2. When an image on the film is obliterated with a round black mark it is an indication that the film inspector noticed either blurred copy because of movement during exposure, or duplicate copy. Unless we meant to delete copyrighted materials that should not have been filmed, you will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., is part of the material being photographed the photographer has followed a definite method in "sectioning" the material. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.

4. For any illustrations that cannot be reproduced satisfactorily by xerography, photographic prints can be purchased at additional cost and tipped into your xerographic copy. Requests can be made to our Dissertations Customer Services Department.

5. Some pages in any document may have indistinct print. In all cases we have filmed the best available copy.

University
Microfilms
International

300 N. ZEEB ROAD, ANN ARBOR, MI 48106
18 BEDFORD ROW, LONDON WC1R 4EJ, ENGLAND

EBERHARDT, BRUCE JEROME

BIODATA DETERMINANTS OF VOCATIONAL TYPOLOGY

Iowa State University PH.D. 1979

Biodata determinants of vocational typology

by

Bruce Jerome Eberhardt

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY

Major: Psychology

Approved:

Signature was redacted for privacy.
In Charge of Major Work

Signature was redacted for privacy.
For the Major Department

Signature was redacted for privacy.
For the Graduate College

Iowa State University
Ames, Iowa

1979

TABLE OF CONTENTS

ACKNOWLEDGMENTS

I would like to thank the many people who contributed to my graduate studies and to the writing of this dissertation. First, I would like to thank the members of my doctoral committee, Dr. Robert F. Strahan, Dr. Wilbur L. Layton, Dr. David C. Edwards, and Dr. William F. Woodman, whose constructive comments and suggestions were greatly appreciated.

Special thanks goes to my major professor, Paul Muchinsky, for guidance in the writing of this dissertation. His suggestions concerning the design and writing of this work proved to be invaluable. His professional excellence served as a model for me during my last two years of graduate study.

Finally, I want to express a special word of thanks to my family for their support and patience throughout my graduate studies. Though they may not have always understood the nature of my studies, they supported me with unquestioning faith.

INTRODUCTION

The 1960s and 1970s have been characterized by a resurgence of interest in vocational behavior and by the development of plans, systems, and methods for the facilitation of vocational exploration, preparation, and decision-making. Information about vocational preference is voluminous and accelerating. It is not surprising in a society in which many people have the opportunity to choose their careers, and in which the broad significance of work is recognized, that attempts to understand the decision-making process involved in career development should be made.

Knowledge of vocational behavior has emanated from three main streams of vocational research. Investigators have studied vocational interests or preferences, vocational choices, and the characteristics of people in different occupations. Although these concepts are closely related, somewhat separate literatures have been maintained. Holland (1976a) regards these three concepts as similar phenomena and sees a need to integrate the current knowledge of the three concepts in order to advance the knowledge of vocational behavior.

The major portion of the research which has been conducted has been stimulated by a number of career development theories. These theories take various approaches in

describing vocational behavior. The approaches include those based on personality (Roe, 1956; Holland, 1959), developmental processes (Ginzberg, 1952; Super, 1957), and psychoanalytic theory (Bordin, 1943; Bordin, Nachman, & Segal, 1963). Theories of career development are not theories in the traditional sense (Marx, 1970). The current theories are not fully developed, but rather are theory "fragments" which attempt to integrate and systematize a portion of human behavior with respect to a specific human problem.

It is not unreasonable to suggest that current theoretical formulations in vocational psychology are imperfect and suggestive of minimal yet varying practical applications, yet at the same time holding potential for the future sophistication of vocational counseling. The present study looks at Holland's (1973) theory of careers and investigates the possibility of making an extension of that theory.

A Description of Holland's Theory

After many experiences working with people making career choices, Holland (1959) first articulated his theory in a brief journal article. Following several subsequent years of encouraging research, Holland constructed a more systematic formulation of this theory which appeared in the form of a brief book (1966). His third statement of the

theory (1973) was a more complete account and is more comprehensive and systematic than the other two efforts. The theory is now actually a theory of careers since it is concerned with vocational problems throughout the life span: vocational choice (selecting and changing jobs); occupational achievement; and vocational satisfaction.

Basically, the composition of the theory involves several relatively simple conceptualizations. First, Holland states that the majority of the people in our society can be characterized as belonging to one of six types or categories: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional (see Appendix A). Each type is both a characterization of what we know about people in a given occupational group and a special way of comprehending such information.

Generally, each type is an ideal or theoretical model against which we can measure the real person. According to the theory, the interaction between a variety of cultural and personal forces, including peers, parents, social class, culture, and the physical environment, produces the various types. From his experiences with the prevalent forces, the individual learns to prefer some activities more than others. Over time these preferences are believed to develop into strong interests. Later, such interests lead to a

special group of competencies. Finally, the interests and competencies combine to create specific personal attributes which lead him to behave in a particular way.

By comparing a person's disposition with those of each type, the individual's resemblances to each model type can be determined. That model type which he most resembles becomes his modal personality type or orientation. Comparison of the person's resemblance to each of the model types yields a pattern of similarity and dissimilarity. In theoretical terms this pattern is known as the person's personality pattern.

The second basic concept of the theory is that there are six kinds of work environments which are described by the occupations of the people who comprise them: Realistic (e.g., farmers, truck drivers); Investigative (e.g., chemists, biologists); Artistic (e.g., musicians, artists); Social (e.g., social workers, teachers); Enterprising (e.g., salesmen, politicians), and Conventional (e.g., bookkeepers, bank tellers) (see Appendix B). Each environment is typified by physical settings posing special problems and stresses which arise from the fact that each environment is dominated by a given type of personality. For instance, social environments are dominated by social types - that is, most of the people in the social environment resemble the social type. In other words, where people congregate, they form an

environment that reflects the types they are, and it becomes possible to assess the environment in the same terms as we assess people individually. Each environmental model is characterized both by the tasks and activities performed and by the situation or atmosphere created by the dominant type.

Finally, it is assumed that people seek environments that match their personality type. They desire environments that will allow them to exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles. Also, to a lesser degree, environments search for people through friendships and recruiting practices.

It is now appropriate to introduce several principles which Holland deemed plausible and upon which the previously stated concepts were based. First, the behavior of choosing a vocation is assumed to be an expressive act reflecting a person's motivation, knowledge, personality, and ability. Holland states this assumption in the following manner:

> Occupations represent a way of life, an environment rather than a set of isolated work functions or skills. To work as a carpenter means not only to use tools but also to have a certain status, community role, and a special pattern of living. In this sense, the choice of an occupational title represents several kinds of information: the person's motivation, his knowledge of the occupation in question, his insight and understanding of himself, and his abilities (Holland, 1975, pp. 5-6).

Research has indicated that vocational preferences are moderately correlated with personality scales (Holland, 1973),

personality traits and life goals (Baird, 1970), and parental attitudes (Medvene, 1969).

Following logically from this first principle comes the second: Interest inventories are essentially personality inventories. If one thinks of vocational interests as expressions of personality, it is a small step to conclude that interest inventories are personality inventories. The two types of inventories are identical in principle and provide similar information about the person, although their content is quite different. Each reveals how a person perceives himself and his environment. Based on this belief, Holland has constructed a personality inventory composed entirely of occupational titles, the Holland Vocational Preference Inventory (VPI) (1958, 1965). In general, the scales of the VPI were constructed and developed by hypothesizing that preferences for occupations are expressions of personality.

A third principle is that most people view the vocational world in terms of occupational stereotypes. There is an extensive amount of evidence for the validity of this assumption (Schutz & Blocher, 1960; O'Dowd & Beardslee, 1960, 1967; Holland, 1963, 1964; Hollander & Parker, 1969). These stereotypes appear to be stable over periods of time and are independent of occupational experience and sex of the perceiver. This is an important assumption, since it is

fundamental to the reliability and validity of the VPI.

Another assumption is that members of a vocation have similar personalities and similar histories of development. It is Holland's belief that if a person enters a given vocation because of his particular personality and history, it follows that each occupation attracts and retains people with similar personalities. The results of Laurent's study (1951) of engineers, physicians, and lawyers provide evidence for the similarity in life histories of members of a vocation. Other studies supporting this contention include Roe (1957), Kuhlberg and Owens (1960), Nachman (1960), and Chaney and Owens (1964). This assumption is of particular importance to the present study.

Validity of the Theory

As evidenced by the already cited literature, Holland's general principles have received moderate empirical support. In turn, his theory of careers and its occupational classification, which evolved from the principles have also received modest support from the extensive research testing the theory. Holland (1973) summarizes more than 100 empirical studies about the characteristics attributed to the six VPI scales, or to people categorized as one of the six types. More than 90 of these investigations are believed

to yield supportive evidence (Holland, 1973).

Another method of investigating the construct validity of the theory has been to relate the VPI to other personality measures. The VPI has been intercorrelated with the California Personality Inventory (Folsom, 1971), the Minnesota Multiphasic Personality Inventory (Holland, 1965), Cattell's 16 Personality Factors (Williams, 1972), The Thurstone Temperament Schedule (Holland & Nafziger, 1972), and other personality inventories. Generally, these and other data yield weak to moderate relationships between the VPI scales and similar scales in other measures.

Further construct validity of the VPI and, hence the theory itself, has been obtained by correlating VPI scale scores with other interest inventories. The VPI scales appear to have moderate and clearly defined relationships to the Kuder (Rezler, 1967; Holland & Nafziger, 1972). The VPI scales have also been compared with the Strong Vocational Interest Blank scales using several methods (Lee & Hedahl, 1973; Campbell & Holland, 1972). In general this voluminous amount of data indicates that the VPI and the Strong assess similar dimensions.

There is also evidence indicating that the VPI, and in turn the theory, exhibit criterion-related validity. Gaffey and Walsh (1974) and Lacey (1971) provide support for

the concurrent validity of the theory by looking at the relationship between the occupations of employed adults and their scores on the VPI. Holland (1962, 1968) and Osipow, Ashby, and Wall (1966) conducted similar studies, yielding similar results with college students by relating college majors to VPI scores. The theory is also not without evidence for its predictive validity. In studies of vocational aspiration, the VPI has been found to be predictive of choice of major field and occupation over one- and two-year intervals for both students of average and high aptitude (Holland & Lutz, 1968; Holland, 1962).

To summarize, investigations based on Holland's theory have been very extensive. There is considerable evidence from Holland's research that the personality types exist much as he described them in his theoretical formulations. Most of the characteristics of the types were found to hold, plus a large number of other characteristics and traits that further serve to differentiate them from one another. Given a subject's high point VPI score, an investigator will be able to predict with some certainty the student's vocational choice, some of his personal characteristics, and the stability of his vocational choice. He also has a basis for drawing inferences about the subject's motives.

Extension of the Theory

Despite the fact that Holland's theory has been a popular topic of research and has met with favorable results, there remains room to extend his theory. Holland does indicate the way modal personality types or orientations affect vocational behavior once orientations are clearly established. If one is clearly dominant over others, a person will seek employment on a job which offers an occupational environment corresponding to the orientation. However, Holland does not expressly state how these dominant personality orientations become established.

The ease with which one makes his decisions is affected by the clarity of his personality pattern. Thus, if life circumstances (unspecified by the theory) result in an uncrystallized modal type, difficulty will be encountered in selecting an occupational environment and the individual will change from one environment to another. As Osipow (1973) points out, a shortcoming in Holland's theory arises from the fact that he does not explicitly discuss the manner in which these modal orientations or types develop. In other words, Holland does not state explicitly the antecedents which result in or cause a person to adopt one personality type as his own over the other types.

Presumably, Holland believes that the development of the styles corresponds to the basic notions surrounding

personality development of other theorists, that is, the personality at a given point in time is the result of both genetic and environmental factors. However, this statement is too general to be of value in understanding personality development or vocational preference. More concrete knowledge of the antecedents of modal personality type development is needed. The following section is a brief review of studies which investigated possible antecedents or determinants of vocational preferences.

Studies Investigating Antecedents of Vocational Preference

One line of research which investigated the antecedents of vocational preferences or choice was stimulated by Roe's (1957) theory of vocational choice. This theory proposes that the major variable in the individual's selection of an occupation is the family atmosphere experienced during childhood. Of utmost importance in determining this family atmosphere are parental attitudes toward their children. Roe postulates that parents can express one of three attitudes toward their children: Acceptance (understanding), Concentration (overprotective or demanding), or Avoidance (neglect). She goes on to state that children who perceive attitudes of Acceptance or Concentration would enter person-oriented occupations, whereas children who perceived an attitude of Avoidance would enter nonperson-oriented

occupations. Numerous studies have been conducted to investigate the relationship of perceived family atmosphere to vocational choice. The results of such studies have been equivocal at best. Some of the studies have supported the theory (Roe & Siegelman, 1964; Green & Parker, 1965; Medvene, 1969), while others have been nonsupportive (Hagen, 1960; Utton, 1962; Switzer, Grigg, Miller, & Young, 1962).

Parental occupation has also been researched as a possible determinant of vocational preference. Much of this research has been designed to test Holland's hypothesis that parents encourage the development of their own personality types in their offspring. Grandy and Stahmann (1974) collected data from freshmen at a large midwestern university. Parents' personality types (occupations) were compared with offsprings' personality types (expressed occupational choices). Results indicated that a positive relationship existed between the personality types of father-offspring combinations, but relationships between the personality types of mother-offspring combinations were not significant. Dewinne, Overton, and Schneider (1978) replicated the Grandy and Stahmann study using a larger sample and a more stringent statistical criterion. Their findings were consonant with the findings of the previous study. Werts (1968) used the Strong Vocational Interest Blank to compare fathers' occupations with sons' career choices. Results

indicated that for sons of professionals, the occupational groupings on the Strong are useful in describing broad types of "inherited" occupations. The same relationship did not exist for sons whose fathers were nonprofessionals.

Another group of studies has looked at the possible effects of a limited number of demographic variables. Because most studies of this nature use only a few selected variables, it is difficult to assess the relative influence of such background variables, although social class, education, and intelligence usually outdistance most other variables (Berdie, 1944; Gribbons & Lohnes, 1969; Kohn, 1969; Kohn & Schooler, 1969; Bachman, 1970). For example, Kohn (1969) documents how characteristic attitudes of parents at different social strata affect their children's vocational aspirations. Fathers of high status value self-direction more than conformity to externally imposed standards, whereas fathers of low status value conformity more than self-direction. Bachman (1970) has found that boys of high social status are more likely to possess the intellectual abilities demanded in our society for success in school and on the job; and, equally important, they display higher aspirations and more positive self-concepts. Astin (1967), expanding this type of research, discovered that the discriminatory power of a test battery of personal characteristics, designed

to assess career expectations, could be improved by adding selected environmental characteristics of the high school attended by subjects. Such characteristics as school size, the mean score on a high school reading comprehension test, and the percentage of graduating males who go on to college aided prediction.

Finally, the closest Holland comes to explaining how modal personality types develop is when he expresses the importance that social pressures in early adolescence and childhood experiences with parents have in influencing vocational choices. Since such influences occur before the personality type is fully developed, these experiences are likely to influence the development of the type rather than influence choices after the type is developed.

The kinds of studies just reviewed do provide partial information as to the antecedents or determinants of vocational preferences, or, in Holland's terms, modal personality types. However, what is needed is a more systematic, organized manner in which to summarize possible determinants of developing personality types. The author believes that a possible answer to such a need is the use of scored biodata or life history forms. The next two sections will describe how biodata has already been used in studying vocational behavior and its use in the present study.

The Use of Biodata in Studies of Vocational Interests

Before looking at some of the studies which used biodata in research on vocational behavior, a brief description of what autobiographical data are will be presented. Objective or scorable autobiographical data as inputs for predictive, diagnostic, or counseling purposes are typically secured by use of some more or less standardized form, a Biographical Information Blank (BIB), a Biographical Data Form, an Individual Background Survey, a Life History Survey, or something similar. The data form has commonly been composed of multiple choice items which permit the respondent to describe himself in terms of demographic, experiential, or attitudinal variables presumed or demonstrated to be related to personality structure, personal adjustment, or success in social, educational, or occupational pursuits. Although the items usually call for "factual" data, those which measure attitudes, feelings, and value judgments resulting from experience have not been excluded. Two important features of the data are that they are: 1) self-reports (autobiographical) and 2) in a format which lends itself to conventional psychometric evaluations and interpretations.

With this information as background it is now possible to look at several of the studies which utilized biodata or life history data to research vocational behavior. A group of studies has relied on large scale surveys of the life

histories of engineers, lawyers, physicians, and other professionals to investigate typical life experiences of members of such occupations (Laurent, 1951; Kuhlberg & Owens, 1960; Nachman, 1960; Albright & Glennon, 1961; Galinsky, 1962; Chaney & Owens, 1964). For example, Kuhlberg and Owens (1960) correlated a 100-item life history form with the scores of mechanical engineering freshmen on the engineering scale of the Strong Vocational Interest Blank. The results suggest that the typical engineer has a history of painful or somewhat unsuccessful personal-social relationships and that he has a history of superior performance in science along with more enjoyment of quantitative and practical courses rather than in linguistic and social studies. And, the prospective engineer "has a history of long career planning, of liking to work with things and ideas as opposed to people, and of enjoying creative work and disliking routine" (Kuhlberg & Owens, 1960, p. 29).

Laurent's study (1951) of engineers yielded similar results and provides some model histories of other occupations which are also consistent with some of the traits attributed to those professions. Laurent finds that lawyers have come from families characterized by much social activity.

Continuing with this type of research, Albright and

Glennon (1961) were able to develop a 43-item personal history key which significantly discriminated between scientists in research or administrative positions. Galinsky (1962) looked at the life histories of physicists and clinical psychologists and found significant differences between the two groups. Of particular importance in distinguishing between the two groups were parental behaviors relating to discipline. Fathers of physicists were more clearly dominant and masculine, while the clinical psychologists' fathers allowed more discussion in disciplinary situations. Chaney and Owens (1964) analyzed the responses of freshmen college students to a 170-item multiple choice life history questionnaire against criteria of sales, research, and general engineering interest. The significant items were summarized by content category and used to develop scoring keys for each interest criterion. When these keys were cross-validated on completely independent samples, correlations of .57, .42, and .51 were obtained for sales, research, and general engineering, respectively. These findings provide empirical data regarding the development of engineering interest and suggest the potential feasibility of using scored life history data to predict the subsequent development of vocational interests.

Since these first attempts to relate biodata to vocational interests and behaviors, the possibility of using biodata to assess not only the individual's vocational

behavior, but his behavior in general, has been advanced in two papers by Owens (1968, 1971). Owens (1968) has suggested a conceptual model for biodata research. In substance, it is a developmental-integrative model designed to draw measurement and experimentation, and indeed all the behavioral sciences, somewhat closer together. An important part of his model lies in grouping people according to their patterns of prior experience so that we can develop laws for different types and subtypes rather than going to either extreme - studies of individuals or whole populations. For this purpose, Owens suggests the use of scored autobiographical forms.

For the student of measurement and its applications, the model provides the antecedent information required for "causal-type inferences" and enhanced understanding. For the experimentalist, it offers the possibility of employing relatively more homogeneous subsets of subjects and thus of reducing error; it also affords knowledge of the subjects' pre-experimental experience and behavior. For behavioral scientists in general, it provides a conceptual framework to which anyone who systematically observes human behavior may attach his findings. Owens (1971, 1976) fully details the implications of his approach for individual assessment.

Several studies have appeared which use Owens' model to investigate the characteristics of members of various job classifications. Klimowski (1973) focused on an instrument that appeared useful for career guidance and job assignment purposes - the Biographical Data Bank. Responses of three groups of engineers (holding research and development, management, and nonengineering positions) to a life history questionnaire were analyzed. Results indicated that groups could indeed be differentiated using response patterns. In addition, items defining these patterns were related to demands of actual career paths chosen.

Schoenfeldt (1974) developed a model for the assessment of individual characteristics, the identification of psychological requirements of jobs, and the classification of applicants to job opportunities. The validity of the model was investigated with a large sample of students working toward a college degree. Subgroups formed on the basis of previous behavioral data collected during the freshmen year differed with respect to criterion (arts-sciences versus applied studies, grade point average, etc.) measurements taken four years later. More importantly, the subgroups differed with respect to the curricular paths taken during college. The results indicated that it was possible to differentiate people in meaningful ways, to identify job families and to match people with jobs.

Morrison (1977) tested the applicability of Schoenfeldt's assessment-classification model to placement decisions within a large industrial organization. Eight developmental-interest dimensions describing the early life behaviors, values, and interests of 438 blue-collar workers were formulated. Job analysis identified two clusters of positions that were homogeneous within and differentiated between each other on relevant job attributes. One cluster consisted of process operator positions and had 102 incumbents with more than 6 months' service. The other cluster was composed of heavy equipment operator positions that had 148 incumbents. The 250 incumbents were randomly divided into validation and cross-validation groups. A discriminant analysis was conducted on the validation group to develop a linear combination of the life history factors that maximally differentiated the two job families. Cross-validation demonstrated that three psychologically meaningful dimensions discriminated between the groups at both statistical and practical levels of significance. The process operators were more likely to be raised in an urban environment, to have a more favorable self-image, and to prefer standardized work schedules.

Given the results of these studies exhibiting the utility of Owens' developmental-integrative model in the

area of job classification, the present study was undertaken. The next section states the purposes of the study and several hypotheses.

The Present Study

The present study serves two primary purposes. The major purpose is to determine whether subgroups formed on the basis of subjects' responses to Holland's Vocational Preference Inventory differ in regard to factor scale scores obtained from an analysis of subjects' responses to a biodata questionnaire. As mentioned previously, an extension of Holland's theory is possible if one can more succintly state the manner in which modal personality types are developed. If differences among the subgroups on their factor scale scores are found to be significant, one would have an indication of what biodata or life history factors determine whether a person will develop into one type versus the other types. As Owens (1968) suggested, biodata provides the antecedent information necessary for "causal-type inferences" and enhanced understanding. Also, Holland (1976a) himself acknowledges the potential utility of biodata by stating,

> . . . the structure, reviewed earlier, which appears common to most occupational classification schemes appears especially helpful for identifying groups and subgroups that have similar personal histories and characteristics (p. 557).

The use of terminology such as "determine" and "causal-type inferences" implies cause-and-effect relationships. It is recognized that correlational data (the nature of the present study) do not prove causality. However, researchers studying causal models have advanced theories stating that, if a temporal priority can be established for one of the variables in a correlational analysis, causality may possibly be inferred (Blalock, 1971). In the present study it is assumed that the life experiences of an individual during his early and middle adolescent years come temporally before any vocational decisions and thus help shape such decisions. It would be difficult to imagine the "typical" adolescent making a vocational decision and then consciously managing his life experiences to suit his decision. When viewed in this manner, it seems plausible that life experiences do play a part in "causing" one's vocational preferences. However, the reader is again cautioned that one cannot prove causality with correlational data and that he/she should be aware of other possible factors which may help determine vocational preference.

The second purpose of the present study is to compare the factor structure obtained from subjects' responses to the bio-data form in this study to the structure obtained by Schoenfeldt (1970a) and Owens (1971). Owens (1971) makes a case for the utility of contributing additional information about the backgrounds of individuals belonging to specific subgroups. He states that "if we know that meaningful, distinctive,

differential behavior is associated with subgroup membership, we may then identify an individual to be assessed, match his biodata profile with the subgroup profile it most closely resembles, and predict the modal or typical behavior of the subgroup for the individual" (Owens, 1971, p. 997). However, if the factor structure of responses to biodata forms varies from one study to the next, the characteristics of subgroup membership in one sample can not be generalized to other samples.

In summary, two general hypotheses are to be tested in the present study:

1) Subgroups, defined by subjects' scores on the VPI scales, will differ significantly on factor scores obtained from the biodata form. This hypothesis relies on the belief that the development of a person's modal personality type is shaped, to some extent, by his past life history or biodata experiences.
2) It is hypothesized that the factor structure obtained from responses to biodata in items in the present study will be similar to structures previously obtained. This hypothesis is based on the fact that the two universities, Iowa State University and the University of Georgia, from which the two samples are drawn, are quite similar in

nature. Both are science- and engineering-oriented versus an orientation toward the liberal arts. It could be expected that students who choose to enroll in such universities would have similar interests and backgrounds. Also, the work of Schoenfeldt (1970b), in which he successfully cross-validated subgroup assignment on the basis of life history items, provides indirect evidence for the factor stability of the Biographical Information Blank.

METHOD

Subjects

Subjects for the present study were male and female students enrolled in undergraduate psychology courses at Iowa State University. The students participated in return for credit towards their course grades. Four hundred thirty-seven females and 379 males took part in the study. The subjects in the Owens' (1971) study, which was used as a comparison study in determining the stability of the factor structure obtained with the Biographical Information Blank (BIB), were 1037 freshmen males and 897 freshmen females at the University of Georgia.

Description of Instruments

Vocational Preference Inventory (VPI) (see Appendix C)

The VPI is a personality inventory composed entirely of occupational titles. A person takes the inventory by indicating the occupations which he likes or dislikes. The VPI was first developed in 1958 (Holland) primarily to assess personality. The evidence indicates that it provides a broad range of information about a person's personality traits, values, competencies, and coping behavior. At the same time, the evidence also indicates that the VPI is useful for: 1) assessing vocational interests, since the

Realistic, Investigative, Social, Conventional, Enterprising, and Artistic scales incorporate the main dimensions found in interest inventories, 2) assessing the personality types in a theory of careers (Holland, 1973), and 30 Stimulating occupational exploration among high school and college students.

The VPI is self-administering. Generally most people require 15 to 30 minutes to complete the inventory. Testing times outside this range are indicative of defensiveness and related emotional problems (Holland, 1975). In addition, excessive testing time may occur because a person lacks sufficient experience or intellectual capacity to understand occupational titles.

All the vocational scales are scored by counting a subject's responses made in the desired direction.[1] For some occupations on a particular scale a "like" response would be the desired response, while for other occupations on the same scale a "dislike" response would be desired. Scoring the inventory yields a numeric code for each scale. All responses are interpreted ipsatively, i.e., a person's typological resemblances are determined relative to his own scores rather than to scores of a special norm group. In the present study, only the highest code letter was used to describe each person's modal personality type.

[1]The VPI also has five additional personality-related scales; Self-Control, Masculinity, Status, Infrequency, and Acquiescence. These scales were not dealt with in the present study.

The validity of the VPI has been demonstrated many times. The evidence for the validity of Holland's theory presented earlier also speaks to the question of the validity of the inventory in that the theory developed out of the rationale for the inventory. Construct, concurrent, and predictive validity have all been demonstrated with the use of the VPI (see Holland (1975)) for a detailed account.

The internal consistency reliability of the six VPI vocational scales: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (R, I, A, S, E, C), ranges from .83 to .88 for a group of 6,289 college males and from .76 to .88 for a group of 6,143 college females. The test-retest reliability of the six scales for a one-year interval ranges from .61 to .86 for 26 college freshmen. In a study with 432 male National Merit Finalists, the test-retest reliability ranged from .47 to .61 for a four-year interval (Holland, 1975). These results suggest that the VPI has moderate to high reliability.

Thus, the VPI appears to be a reliable and valid assessment device. Because of its brevity, the range of information it yields, and the fact it is self-administered, the VPI lends itself well to the purposes of the present study.

Biographical Information Blank (BIB) (Owens, 1971, see Appendix D)

The BIB, in its initial stage, was a 659-item instrument based upon 2,000 item specifications which covered a broad spectrum of prior experiences. The biographical information covered such areas as family life, school-related activities, religious activities, interests and attitudes derived from life experiences, sports participation, and extra-familial relationships (Bryson, 1969).

The BIB was reduced to 389 items by the application of the following criteria: high loading on preliminary factors (minimum loading of .30); demonstrated relevance to a major developmental hypothesis (Owens, 1968); and demonstrated empirical validity (i.e., high correlations with an external variable measuring a dimension of interest). Through the same procedure, the inventory was ultimately reduced to 118 items with all questions cast in a multiple choice format and with the response alternatives arranged on a continuum. Independent factor analyses of the items, by sex, resulted in the identification of fifteen interpretable factors in the female data and thirteen in the male data (Owens, 1971; Schoenfeldt, 1970a). A visual inspection of common item loadings suggests that four factors are completely or nearly identical, that six others are quite similar, and that only five "female factors" and three "male factors" are reasonably character-

istic of a single sex (see Appendices E and F for a listing of the factors).

Procedure

Group data were collected during two periods of time separated by an interval of approximately two years. During the first months of 1977 data were obtained from 377 subjects, 203 females and 174 males. The remainder of the data were collected during April, 1979. These data included information from 234 females and 205 males.

Upon being seated in the data collection room, subjects were instructed to read the instructions for completing both the VPI and the BIB and were then asked if there were any questions. After this, subjects completed both questionnaires by marking their responses on machine-scored answer sheets. Half of the subjects were instructed to complete the VPI first, while the other half completed the BIB first. This precaution was taken as a partial control for any possible order effects. Subjects were also asked to indicate their sex, year in school, and academic major on their answer sheets. The time to complete both surveys was approximately 70 minutes.

After the data were collected, the subjects' responses to the VPI were scored and their six vocational scale scores were computed. Six separate groups were then formed in the following manner: subjects whose highest score was on the

Realistic scale were identified as belonging to the Realistic group; those subjects with a highest score on the Investigative scale belonged to the Investigative group; and so forth for the remaining four scales.

Statistical Analyses

The matrices of item correlations which resulted from subjects' responses to the Biographical Information Blank were factor analyzed separately for the two sexes by the method of principal components (Harman, 1967). Unities were entered on the diagonals. Thirteen factors for the group of male subjects and fifteen factors for females were extracted and rotations to an orthogonal varimax criterion of simple structure were examined (Kaiser, 1958). The particular technique of factor analysis utilized and the number of factors examined were decided upon to approximate the techniques used in the Owens (1971) study.

Individual factors were identified by those items which loaded highly ($\pm$ .30) on those factors. Factor scores for each subject were obtained by summing his or her responses to the items which composed each individual factor. Items were summed using unit weights.

After factor scores had been obtained, multiple regression analyses, employing a least squares solution and involving the regression of the VPI scale scores on the BIB

factor scores, were performed. For the regression analyses two groups of subjects were formed for each sex yielding a validation sample group and a cross-validation group for both sexes. The analyses produced six separate regression equations per validation group, one for each of the vocational scales. A cross-validation procedure was then employed (Mosier, 1951). This involved identifying the beta weights derived from the validation group of males and then applying them in a regression analysis to the cross-validation group. The same procedure was used for the two groups of females. The cross-validation procedure was utilized to examine any shrinkage which may have resulted when the beta weights obtained in the original regression analyses were applied to another group of subjects. A forward selection stepwise regression analysis was also performed (Barr, Goodnight, Sall & Helwig, 1976). This analysis was conducted to determine which of the biodata factors should be included in the regression model. The entire regression process was performed to determine the portion of variance in the VPI scale scores which could be attributed to a subject's past experiences as indexed by his biodata factor scores.

Separate one-way analyses of variance (CR6; Kirk, 1968) employing a least squares solution were also performed with the subjects' factor scores as the dependent variables. The main effect was group membership (Realistic, Intellectual,

Artistic, Social, Enterprising, and Conventional). These analyses were computed to determine if there were significant mean differences on the biodata factor scores among the six vocational groups. For those factors on which significant mean differences were obtained, tests of comparisons among the means were conducted to determine the nature of such differences. Due to large discrepancies in the number of subjects in the various groups, a modification of Tukey's WSD test was employed for the comparisons (Keselman & Rogan, 1977).

Finally, the factor structure obtained in the analysis of the BIB in the present study was compared with the structure found by Owens (1971) in order to determine the factor structure stability of the BIB. Two types of comparisons were made. The first was a visual comparison which involved the visual matching and assessment of the results from the two studies.

The other comparison was statistical in nature and was used to augment the visual comparison. A product moment correlation coefficient was computed for the factor loadings of items which made up ostensibly similar pairs of factors from the two studies. The product moment correlation coefficients allow one to compare the pattern of loadings between factors across the two studies.

A problem, associated with the fact that complete

information from the Owens (1971) study was not available to the present author, arose when computing the correlation coefficients. The difficulty occurred when an item loaded significantly on a factor in the present study but happened not to load on the analog factor in the Owens study. Only the loadings of the items which constituted a factor (loading at least $\pm$ .30) in the Owens study were available for the comparisons. To address this problem, correlation coefficients were calculated between congruent factors under three different item loading assumptions. First, it was assumed that the items in question loaded .29 on the particular factor, or, in other words, "just missed" loading significantly ($\pm$ .30) in the positive direction. Under the second assumption the signs of the loadings for the initial assumption were reversed so that items "just missed" loading significantly in the opposite direction (-.29). Finally, it was assumed that the items in question did not load at all on the factor and were ascribed loadings of .00.

RESULTS

Factor Analysis of Biodata Responses

Tables 1 and 2 summarize the results of the factor analyses of the subjects' responses to the Biographical Information Blank for males and females, respectively. These tables report the significant (±.30 or greater) item loadings for each factor, the communalities for each item, the eigenvalues for each factor, and the percent of total variance accounted for by each factor.

As previously stated, thirteen factors were examined for the male sample. These factors accounted for 53.8% of the total variance associated with the subjects' responses to the BIB. The following is a brief description of the male factors. The numbers in parentheses indicate the number of items which represented each factor.

Factor I. Athletic Involvement (10):

Subjects who scored low on this factor were very active in athletic activities, often engaged in team sports, enjoyed physical education courses, rated past performances in physical activities very high, considered themselves much more popular than their classmates, and were at ease in social situations.

Table 1. Factor loadings on biodata factors for male subjects

Item	Factor I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	h^2
Bio 1									.58					.42
Bio 2			.53											.47
Bio 3			.59											.52
Bio 4											.42			.31
Bio 5			.52											.48
Bio 6											.38			.28
Bio 7							.44							.37
Bio 8											.56			.39
Bio 9			.59											.49
Bio 10					.49					.34				.50
Bio 11							.38							.27
Bio 12							.51							.34
Bio 13														.33
Bio 14									.48					.41
Bio 15		.36											.40	.42
Bio 16											.40		.34	.40
Bio 17													.54	.47
Bio 18													.48	.40
Bio 19											.30		.46	.42
Bio 20								.51						.34
Bio 21			-.56											.37
Bio 22			-.68											.51
Bio 23									.50					.43
Bio 24							.54							.45
Bio 25					-.33		.59							.48
Bio 26							.63							.46
Bio 27									.55					.45
Bio 28							.32							.26
Bio 29											.40			.36
Bio 30							.38							.31

Table 1 (Continued)

Item	Factor													h^2
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	
Bio 31					-.30		.45							.40
Bio 32				-.32										.25
Bio 33									.49					.27
Bio 34			-.71											.59
Bio 35												.68		.59
Bio 36					.42						.34			.42
Bio 37											.61			.46
Bio 38							.43							.25
Bio 39		.72												.59
Bio 40				.55										.40
Bio 41				-.48										.32
Bio 42			.71											.60
Bio 43						.70								.57
Bio 44						.73								.58
Bio 45				-.68										.53
Bio 46				-.71										.58
Bio 47				-.58										.37
Bio 48				.61										.44
Bio 49				-.46										.37
Bio 50				-.52										.43
Bio 51				.60										.45
Bio 52			-.54						.30					.46
Bio 53									.66					.52
Bio 54		.66												.52
Bio 55				.50					.34					.46
Bio 56												.67		.58
Bio 57												.61		.46
Bio 58					-.59									.42
Bio 59					.59									.52
Bio 60		-.32			-.40					-.49				.56
Bio 61													-.39	.30

Table 1 (Continued)

Item	Factor I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	h^2
Bio 62													.55	.44
Bio 63		-.79												.65
Bio 64		-.79												.64
Bio 65	.69													.64
Bio 66	.30				.49									.53
Bio 67	.74													.72
Bio 68									.50					.37
Bio 69									.70					.60
Bio 70		.63												.48
Bio 71					.37									.28
Bio 72					-.42									.30
Bio 73								.42						.34
Bio 74								.37						.23
Bio 75													.42	.36
Bio 76	.34				.53									.58
Bio 77	.65													.54
Bio 78						.78								.66
Bio 79					-.53									.49
Bio 80												-.54		.51
Bio 81					-.44									.39
Bio 82												.62		.56
Bio 83			.55											.41
Bio 84		.36											.58	.58
Bio 85		.48												.40
Bio 86									.53					.41
Bio 87										.30				.20
Bio 88									.63					.50
Bio 89		.54						.45						.56
Bio 90		.50						.35						.47
Bio 91								-.56						.46
Bio 92		-.34						-.43						.38
Bio 93					-.50									.42

Table 1 (Continued)

Item	Factor													h^2
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	
Bio 94					.43								.30	.31
Bio 95		.32						.64						.59
Bio 96													.47	.41
Bio 97														.55
Bio 98								.52						.39
Bio 99								.65						.57
Bio 100	.60													.44
Bio 101	.79													.69
Bio 102								.61						.50
Bio 103	.67									.52				.42
Bio 104		-.32	.30											.55
Bio 105		.71												.39
Bio 106		.72						.34						.65
Bio 107		.58												.67
Bio 108		.65								.36				.53
Bio 109														.55
Bio 110					.32					.47				.39
Bio 111										.47				.33
Bio 112								.30		.42				.42
Bio 113						.69								.56
Bio 114					.38					.53				.55
Bio 115	.78													.66
Bio 116										.30				.25
Bio 117										.58				.44
Bio 118	.61													.51
Eigen-value	11.51	7.62	5.29	4.29	3.82	3.68	3.10	3.05	2.67	2.40	2.26	2.15	2.02	
% of variance	5.6	7.0	4.5	4.1	4.7	3.3	3.6	3.9	4.7	3.2	3.0	2.8	3.4	53.8

Table 2. Factor loadings on biodata factors for female subjects

Item	Factor															h^2
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
Bio 1										.70						.62
Bio 2			-.38				.32	-.34								.43
Bio 3			-.35				.38	-.46								.56
Bio 4								-.40								.33
Bio 5			-.39				.34	-.47								.57
Bio 6							.30						.44			.34
Bio 7							.56									.47
Bio 8													.40			.40
Bio 9			-.60													.57
Bio 10	.64															.56
Bio 11							.49									.37
Bio 12							.43									.26
Bio 13							.33									.21
Bio 14								.41		.33						.52
Bio 15	.30													.46		.47
Bio 16													.54			.41
Bio 17														.55		.53
Bio 18														.47		.44
Bio 19													.50	.30		.52
Bio 20												.60				.46
Bio 21			.62													.46
Bio 22			.74													.64
Bio 23							.34	.32		.38						.46
Bio 24							.63									.47
Bio 25	-.30						.65									.57
Bio 26							.56									.41
Bio 27										.57						.50
Bio 28							.41	-.30								.34
Bio 29	.30												.64			.53
Bio 30	-.38						.56									.53
Bio 31	-.45						.34									.42
Bio 32																.23
Bio 33										.69						.54

Table 2 (Continued)

Item	Factor															h^2
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
Bio 34			.78													.63
Bio 35									.68							.58
Bio 36	.49												.46			.52
Bio 37													.47			.36
Bio 38							.44									.29
Bio 39		.66														.62
Bio 40				.46												.42
Bio 41				-.31												.39
Bio 42			-.82													.70
Bio 43						.77										.65
Bio 44						.74										.61
Bio 45				-.62												.50
Bio 46				-.77												.62
Bio 47				-.58												.44
Bio 48				.76												.62
Bio 49				-.54												.47
Bio 50				-.50												.43
Bio 51				.59												.56
Bio 52			.56													.48
Bio 53										.63						.55
Bio 54		.56														.51
Bio 55				.54						.37						.51
Bio 56									.74							.61
Bio 57									.64							.48
Bio 58	-.48															.43
Bio 59	.64															.50
Bio 60	-.53										-.37					.55
Bio 61														-.33		.33
Bio 62														.49		.43
Bio 63		-.71														.61
Bio 64		-.72														.62
Bio 65	.31				.63											.58

Table 2 (Continued)

Item	Factor															h^2
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
Bio 66	.56															.49
Bio 67					.82											.72
Bio 68								.56								.54
Bio 69										.74						.65
Bio 70		.51										.32				.50
Bio 71																.16
Bio 72	-.49															.38
Bio 73											.33	.39				.34
Bio 74											.33					.36
Bio 75														.48		.39
Bio 76	.69															.58
Bio 77					.77											.65
Bio 78						.78										.68
Bio 79	-.48															.48
Bio 80															-.73	.62
Bio 81	-.50														.70	.45
Bio 82																.60
Bio 83			-.54													.47
Bio 84		.30												.62		.59
Bio 85		.49												.33		.56
Bio 86								.64								.66
Bio 87								.33								.33
Bio 88								.46		.40						.56
Bio 89												.72				.62
Bio 90		.31										.73				.68
Bio 91												-.58				.51
Bio 92												-.71				.59
Bio 93	-.45															.39
Bio 94	.43												.34			.36
Bio 95												.80				.71
Bio 96																.37
Bio 97					.73											.58

Table 2 (Continued)

Item	Factor															h^2
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	
Bio 98											.41					.45
Bio 99											.32					.42
Bio 100					.65											.51
Bio 101					.73											.58
Bio 102												.68				.55
Bio 103											.52					.46
Bio 104					.55											.44
Bio 105																.26
Bio 106		.54										.49				.56
Bio 107		.52										.62				.69
Bio 108		.64														.50
Bio 109		.69														.56
Bio 110											.37					.35
Bio 111											.52					.40
Bio 112											.57					.44
Bio 113						.72										.63
Bio 114	.58															.48
Bio 115					.80											.69
Bio 116											.48					.34
Bio 117											.64					.46
Bio 118					.57											.48
Eigenvalue	12.61	7.01	5.44	4.68	4.20	3.81	3.21	2.88	2.66	2.37	2.13	1.98	1.96	1.85	1.78	
% of variance	5.6	5.3	4.4	4.4	5.1	3.2	4.2	3.3	2.5	4.0	3.2	5.1	3.1	3.1	2.1	58.6

Factor II. Academic Achievement (18):

Low scoring individuals on this factor had a high standing in their high school class, were often on the semester honor roll, were very competitive and successful in academic situations and tended to like school very much.

Factor III. Parental Control versus Freedom (11):

Parents of individuals scoring low on this factor were more strict, critical, and punitive. The parents more often showed their anger, allowed their children much less freedom or independence, and tended to nag or push their children for better achievement.

Factor IV. Socioeconomic Status (11):

Families of low scoring individuals were characterized by high parental educational level, above average family income, and high paternal occupational status. Both the mothers and fathers of these families belonged to many clubs and/or professional organizations, and there were many books and magazines in their homes.

Factor V. Social Extroversion and Popularity (17):

Low scoring subjects participated more often and directed others in group activities, held many leadership positions in high school, were very active in many high school activities, and met the demands of social situations effectively. Compared

to others in high school, they were more popular, had more casual friends, had more female friends, went to more parties, and dated at an earlier age and more frequently.

Factor VI. Religious Activity (4):

Individuals scoring low on this factor were very active in church, religious, or charitable organizations and, compared to others of the same age, went to church more often and had stronger religious beliefs.

Factor VII. Negative Social Adjustment (11):

The people scoring low on this factor frequently wished to become more socially acceptable, more often chose parents or friends to "take things out" on; more often felt downcast, dejected, or self-conscious; suffered "attacks of conscience", and tended to daydream a good deal of the time.

Factor VIII. Scientific Interest (13):

Low scoring subjects enjoyed science and lab courses and found them relatively easy. They often worked with scientific apparatus and equipment outside of any required school assignment.

Factor IX. Warmth of Parental Relationship (12):

Those subjects scoring low on this factor had a close, warm relationship with both parents. Their parents were likely to give them affection, praise, and attention.

Subjects wanted to imitate and be like their father.

Factor X. Extra-curricular Activity (11):

Low scoring individuals were active in high school subject matter clubs, in hobby clubs, political clubs or student council, and worked on the school newspaper or annual. They held several positions of leadership and tended to guide others in group activities. They read literary, business, or scientific magazines regularly and watched educational and cultural television programs.

Factor XI. Independence/Dominance (8):

Persons scoring low enjoyed discussion courses and tended to try to make others see their point of view while frequently questioning teachers on subject matter. They were often regarded as radical or unconventional and often wanted to be alone to pursue their own thoughts and interests.

Factor XII. Sibling Friction (5):

Low scoring individuals felt more friction and feelings of competition toward siblings. They more often argued or fought with siblings and had more younger brothers and sisters closer to their own age.

Factor XIII. Academic Interest (11):

Low scoring subjects liked school and teachers very much. They enjoyed specific courses more while doing more hours of homework. Their teachers were more successful in arousing academic interest.

For the female sample fifteen factors, accounting for 58.6% of the total variance, were examined. The following are descriptions of the female biodata factors. Again, the numbers in the parentheses indicate the number of items representing each factor.

Factor I. Social Leadership and Popularity with the Opposite Sex (19):

Low scoring students often tended to guide or direct others in group activities. They participated in school politics and held several leadership positions in high school. They went on more dates and started dating regularly and going steady at a younger age.

Factor II. Academic Achievement:

Low scoring individuals earned high grades, had a very high standing in their high school class, and were frequently on the semester honor roll. They were competitive in academic situations and expected to be successful in academic situations.

Factor III. Freedom from Parental Control (10):

Parents of low scoring individuals were less strict and critical, allowed more freedom or independence, and were less punitive in taking away privileges.

Factor IV. Socioeconomic Status (10):

Families of low scoring subjects were characterized by high parental educational level and high paternal occupational level. These families had above average family incomes and ranked high in social class. The parents belong to many social and professional clubs. The homes of these families had many books and magazines.

Factor V. Athletic Participation (9):

Individuals scoring low on this factor rated their past performance in physical activities very high, were very active in athletic activities, and enjoyed physical education courses. They more often engaged in individual and team sports and frequently read sports magazines and watched sporting events on television.

Factor VI. Religious Activity (4):

Low scoring subjects had stronger religious beliefs and went to church more often than others their own age and were active in church, religious, or charitable organizations or activities. Religion was very important in the families

of these subjects.

Factor VII. Negative Social Adjustment (16):

Low scoring individuals had frequent misunderstandings with parents, often felt downcast and dejected and often felt like "taking things out" on parents or friends. They suffered frequent "attacks of conscience", wanted to be more socially acceptable and more powerful, tended to be self-conscious and sensitive to criticism, and tended to day-dream a good deal of the time.

Factor VIII. Warmth of Maternal Relationship (11):

In high school low scoring subjects were very close to their mother and their mothers more often provided emotional support and interest. Subjects often discussed intimate and/or important matters with their mothers while having good relations with both parents.

Factor IX. Sibling Friction (3):

Low scoring individuals felt more friction and feelings of competition toward siblings and had more frequent arguments and fights with siblings.

Factor X. Warmth of Paternal Relationship (9):

A person scoring low on this factor was very close to her father and spent relatively more time with him. Fathers provided these subjects with emotional support, interest, and attention. Both of the parents of low scoring subjects were interested in the subjects' activities and gave them affection, praise, and attention.

Factor XI. School and Cultural Activities (11):

Subjects scoring low were active in high school subject matter clubs, in hobby clubs, and worked on the school newspaper or school annual. They held several leadership positions, read literary and business magazines regularly, and watched educational and cultural television programs.

Factor XII. Scientific Interest (11):

Individuals scoring low on this factor enjoyed courses in the sciences, worked more often with scientific equipment or apparatus, and excelled in physical and biological science subjects.

Factor XIII. Independence/Dominance (8):

Low scoring subjects enjoyed discussion courses and tried to make others see their point of view and participated a great deal in small group activities while saying what they felt. These students frequently questioned

teachers on subject matter, were relatively more independent of others, and were often regarded as radical or unconventional.

Factor XIV. Positive Academic Attitude (9):

The teachers of subjects scoring low on this factor were more successful in arousing academic interests and allowed more class participation and discussion. The low scoring subject liked school and teachers to a greater degree, spent more hours per week doing homework trying to achieve to the limits of her abilities, and felt her high school education was adequate.

Factor XV. Position in Family (2):

Low scoring individuals tended to have more younger brothers and sisters closer to their own age.

Tables 3 and 4 show inter-factor score correlations for males and females. The average inter-factor correlation ($|\bar{r}|$) for males was .17 with the highest correlation coefficient being .61 between factors V (Social Extroversion and Popularity) and X (Extra-curricular Activity). For females the average correlation was .16. The highest inter-factor correlation for females was .71 between factors II (Academic Achievement) and XII (Scientific Interest). Despite the presence of a few relatively large correlations, there

Table 3. Intercorrelations of factor scores for males

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
I	-	.15	-.13	.16	.53	.09	-.23	-.02	.39	.17	.04	-.05	.12
II		-	-.01	.06	.24	.13	-.15	.55	.21	.42	.30	-.03	.56
III			-	.03	-.05	.04	.24	.08	-.28	.02	.17	.26	.02
IV				-	.24	.10	.01	.02	.37	.16	.03	.01	.10
V					-	.06	-.35	.09	.33	.61	.26	-.10	.33
VI						-	.04	.02	.18	.15	.01	.04	.12
VII							-	-.11	-.10	-.14	.05	.15	-.13
VIII								-	.05	.22	.34	.06	.28
IX									-	.15	.01	-.08	.26
X										-	.30	-.13	.39
XI											-	.03	.49
XII												-	.01
XIII													-

Table 4. Intercorrelations of factor scores for females

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
I	-	.18	.12	.23	.42	.10	-.36	.28	-.16	.26	.38	.08	.52	.31	-.04
II		-	.23	.11	.05	.21	-.09	.29	-.10	.23	.24	.71	.29	.53	.00
III			-	.06	.05	.02	-.42	.57	-.24	.24	.07	.14	.08	.26	-.11
IV				-	.13	.05	-.09	.22	-.01	.50	.18	.09	.16	.13	.00
V					-	-.01	-.17	.21	-.08	.23	.18	.08	.16	.17	.04
VI						-	.08	.21	-.03	.21	.13	.11	.09	.27	.14
VII							-	.41	.25	-.09	-.05	-.09	-.05	-.17	.06
VIII								-	-.27	.62	.13	.21	.09	.32	-.07
IX									-	-.15	-.10	.12	.00	-.14	.22
X										-	.18	.13	.16	.24	.00
XI											-	.27	.38	.29	-.04
XII												-	.17	.46	.01
XIII													-	.35	-.06
XIV														-	.03
XV															-

appeared to be a general lack of relationship among the factors. For that reason all of the factors were included in the regression analyses.

Regression Analyses

Tables 5 and 6 summarize the results of the regression analyses for the males and females, respectively. These tables report the regression formulas for predicting the subjects' scores on the individual VPI scales from biodata factor scores, the multiple correlation coefficients (R), the percent of variance in scale scores explained by the biodata factors (R^2), the R^2 which results when the beta weights obtained in the original regression analyses were applied to the cross-validation group (R^2_{cv}), and the amount of shrinkage (R^2-R^2_{cv}) which resulted during the cross-validation procedure. The tables also indicate which factors drop out from the regression model when a stepwise regression procedure is used, as indicated by the superscript "b".

As can be seen from Table 5, the multiple correlation coefficients (R) for males ranged from .34 for the Conventional scale to .50 for the Intellectual scale. The least amount of shrinkage was associated with the Artistic scale (.008), while the R^2 for the Social scale suffered the most shrinkage (.107).

Table 5. Regression formulas and results of the regression of VPI scale scores on biodata factors for male subjects[a]

Scale	Formula	R	R^2	R^2_{cv}	Shrinkage
R =	.013 FI[b] + .271 FII - .010 FIII[b] + .097 FIV - .049 FV[b] - .035 FVI[b] - .166 FVII - .491 FVIII - .011 FIX[b] + .060 FX[b] + .179 FXI - .003 FXII + .001 FXIII	.422	.178	.136	.042
I =	-.081 FI + .110 FII + .008 FIII[b] - .106 FIV + .298 FV + .175 FVI + .079 FVII - .370 FVIII + .067 FIX - .152 FX - .100 FXI - .057 FXII - .194 FXIII	.499	.249	.181	.068
S =	-.250 FI - .014 FII[b] + .070 FIII + .039 FIV[b] - .059 FV[b] - .052 FVI[b] - .160 FVII + .243 FVIII + .120 FIX - .041 FX - .122 FXI - .048 FXII - .191 FXIII	.444	.197	.090	.107

[a]N = 185 for validation sample, N = 186 for cross-validation sample.

[b]Factors which drop out in a stepwise regression.

Table 5 (Continued)

Scale	Formula	R	R^2	R^2_{cv}	Shrinkage
C	= -.006 FI[b] + .076 FII + .072 FIII[b] + .109 FIV - .250 FV - .040 FVI[b] - .120 FVII + .043 FVII - .164 FIX + .104 FX[b] + .183 FXI - .023 FXII[b] - .034 FXIII[b]	.340	.116	.041	.075
E	= -.044 FI[b] + .156 FII + .047 FIII[b] - .001 FIV - .151 FV + .0003 FVI - .065 FII + .290 FVIII - .122 FIX - .032 FX + .010 FXI[b] + .060 FXII - .089 FXIII	.431	.186	.128	.058
A	= .015 FI + .153 FII + .058 FIII - .031 FIV[b] + .132 FV + .016 FVI[b] + .008 FVII[b] + .223 FVIII + .020 FIX[b] - .290 FX - .263 FXI - .064 FXII - .090 FXIII	.390	.152	.144	.008

Table 6. Regression formulas and results of the regression of VPI scale scores on biodata factors for female subjects[a]

Scale	Formula	R	R^2	R^2_{cv}	Shrinkage
R =	.154 FI + .254 FII + .048 FIII[b] + .124 FIV − .215 FV + .095 FVI − .093 FVII + .015 FVIII[b] + .033 FIX[b] − .186 FX − .046 FXI[b] − .316 FXII − .059 FXIII − .067 FXIV − .008 FXV[b]	.401	.160	.091	.069
I =	.087 FI + .286 FII + .155 FIII − .025 FIV[b] + .088 FV + .009 FVI[b] − .048 FVII − .094 FVIII − .034 FIX + .022 FX[b] − .046 FXI − .722 FXII − .136 FXIII − .024 FXIV[b] + .143 FXV	.635	.403	.366	.037
S =	−.203 FI + .090 FII + .011 FIII[b] + .009 FIV[b] − .024 FV[b] − .189 FVI − .335 FVII − .199 FVIII + .057 FIX + .122 FX − .040 FXI[b] + .084 FXII − .067 FXIII + .001 FXIV[b] + .041 FXV	.420	.176	.105	.071
C =	−.138 FI − .211 FII − .064 FIII + .032 FIV[b] + .010 FV[b] + .001 FVI[b] − .173 FVII − .136 FVIII − .052 FIX[b] + .001 FX[b] − .119 FXI + .067 FXII[b] + .175 FXIII + .061 FXIV[b] − .114 FXV	.317	.100	.058	.042

[a] N = 212 for validation sample, N = 212 for cross-validation sample.

[b] Factors which drop out in a stepwise regression.

Table 6 (Continued)

Scale	Formula	R	R^2	R^2_{cv}	Shrinkage
E =	-.492 FI - .007 FII[b] - .165 FIII - .065 FIV + .042 FV[b] + .106 FVI - .162 FVII + .105 FVIII - .144 FIX - .007 FX[b] + .004 FXI[b] + .190 FXII + .085 FXIII - .043 FXIV[b] + .052 FXV	.460	.211	.135	.076
A =	-.097 FI - .160 FII - .202 FIII - .209 FIV + .054 FV + .003 FVI[b] - .026 VII[b] + .167 VIII - .119 IX + .168 FX - .156 FXI + .111 FXII - .203 FXIII + .166 FXIV - .016 FXV	.428	.183	.100	.083

As shown by Table 6, the range of the multiple correlation coefficients (R) for the female sample was from .32 for the Conventional scale to .64 for the Intellectual scale. The amount of shrinkage which resulted from using the beta weights obtained from the regression analyses performed on the validation group with the scores from the cross-validation group ranged from .037 for the Intellectual scale to .083 for the Artistic scale. The relative lack of shrinkage exhibited in the results for both sexes attests to the stability of the regression weights in the population.

All of the multiple correlation coefficients reported in Tables 5 and 6 are statistically significant ($p < .01$) except those for the Conventional scales for both males and females. However, due to the large sample sizes involved ($N = 212$ for females, $N = 185$ for males), a multiple correlation coefficient of high statistical significance may have questionable substantive significance.

Analyses of Variance

Before the analyses of variance were conducted, subjects were assigned to one of the six vocational types on the basis of their high point score on the VPI. Table 7 shows the assignment of subjects to the various groups or types. As

Table 7. Assignment of subjects to Holland's classification scheme

Group	Example Occupations	Male	Female
Realistic (R)	Policeman, Carpenter, Engineer	58	3
Intellectual (I)	Chemist, Philosopher	68	49
Social (S)	Judge, Teacher, Social Worker	42	164
Conventional (C)	Accountant, Secretary, Bookkeeper	31	24
Enterprising (E)	Salesman, Politician, Lawyer	79	44
Artistic (A)	Writer, Artist, Musician	51	86
Multiple High Scale Scores		50	67
	TOTAL	379	437

can be seen from Table 7, only three females had their highest scale score on the Realistic scale. For that reason the Realistic type was dropped as a level of group membership in the analyses of variance for the females. Also, fifty males and sixty-seven females did not have one scale score which was higher than all of the others. In other words, they had their high scale score on more than one scale. Because they could not be placed in one of the six groups unambiguously, these subjects were also dropped from the analyses of variance.

The findings from the analyses of variance for males and females are shown in Tables 8 and 9, respectively. These tables report the biodata factor means for each group and the F-value obtained in each one-way analysis of variance. From Table 8 it can be seen that the effect of group membership was statistically significant for five of the thirteen male biodata factors. Tukey's WSD tests of comparison were calculated for those factors on which there was a significant group effect (see Appendix G).

For Factor I, Athletic Involvement, subjects in the Intellectual group had a significantly higher ($p < .05$) factor score than the subjects in the Enterprising group. This indicates that the Intellectual group was less athletically involved than the Enterprising group. Subjects in the

Table 8. Biodata factor means and F-values (effect of group membership on factor scores for males)

Factor	Biodata Factor Means						df	F	p
	R	I	S	C	E	A			
I	23.81	24.60	22.43	21.68	20.95	24.38	322	2.53	.03
II	15.62	10.80	14.77	14.94	15.44	15.23	321	1.87	ns[a]
III	8.69	9.80	8.24	10.48	10.08	9.31	322	1.60	ns[a]
IV	-12.44	-10.22	-10.71	-10.39	-12.12	-13.12	317	1.70	ns[a]
V	5.09	4.60	2.45	2.29	1.24	2.90	322	1.51	ns[a]
VI	11.67	12.97	10.83	12.03	11.94	12.56	322	1.96	ns[a]
VII	34.24	35.13	32.86	35.00	35.33	34.73	322	1.32	ns[a]
VIII	21.52	18.73	25.57	25.81	26.36	25.96	322	12.97	.0001
IX	31.36	31.07	32.76	29.68	29.09	31.90	321	2.31	.04
X	38.41	37.00	35.74	37.87	35.86	35.17	322	2.25	.05
XI	21.74	20.36	21.00	23.87	22.08	19.88	322	5.33	.0001
XII	8.72	8.55	9.19	8.77	10.06	8.69	322	1.35	ns[a]
XIII	25.74	22.91	23.17	25.22	23.70	23.65	322	1.97	ns[a]

[a]ns - nonsignificant.

Table 9. Biodata factor means and F-values (effect of group membership on factor scores for females)

Factor	Biodata Factor Means					df	F	p
	I	S	C	E	A			
I	0.04	-2.43	2.29	-4.05	-1.26	361	2.04	ns[a]
II	9.41	15.81	12.25	14.70	14.99	362	6.73	.0001
III	-11.14	-11.40	-12.21	-11.41	-10.37	362	0.60	ns[a]
IV	-12.61	-10.23	-11.42	-10.59	-11.14	361	1.39	ns[a]
V	23.80	23.12	24.00	22.00	23.64	359	0.50	ns[a]
VI	11.45	10.74	10.04	11.48	10.60	362	0.99	ns[a]
VII	49.69	49.45	49.58	50.04	48.48	361	0.44	ns[a]
VIII	1.20	0.94	0.29	2.14	3.03	362	2.16	ns[a]
IX	9.12	8.72	8.62	8.52	9.40	361	0.75	ns[a]
X	24.24	23.98	22.83	23.68	25.00	359	0.73	ns[a]
XI	35.69	38.39	37.08	37.91	35.95	360	3.50	.01
XII	10.00	20.60	18.29	19.64	19.67	362	22.39	.0001
XIII	20.18	21.46	23.08	21.43	20.08	362	3.26	.01
XIV	14.26	16.94	16.50	16.64	17.85	362	4.13	.0003
XV	0.78	0.49	0.25	0.64	0.71	362	0.26	ns[a]

[a]ns - nonsignificant.

Enterprising, Artistic, Conventional, and Social groups had significantly higher scores on Factor VIII, Scientific Interest, than those in the Intellectual ($p < .01$) and the Realistic ($p < .05$) groups. From Holland's description of the various groups it would be expected that Intellectual and Realistic individuals would have greater scientific interests. The mean for the Social group was significantly higher ($p < .05$) than that for the Enterprising group on Factor IX, Warmth of Parental Relationship. This would tend to indicate that Enterprising subjects had a closer relationship with their parents than did the Social subjects. On Factor X, Extra-curricular Activity, the Realistic group was significantly higher ($p < .05$) than the Artisitc group, indicating they were involved in fewer activities. Finally, Conventional subjects scored significantly higher ($p < .05$) on Factor XI, Independence/Dominance, than subjects in the Social group and also the Intellectual and Artistic groups ($p < .01$). Conventional subjects appear to be less independent than subjects in the other three groups.

Table 9 shows that group membership had a significant effect on five of the fifteen female biodata factors. Again, Tukey's WSD tests of comparison were performed on those factors where a significant group effect was found (see Appendix H). Subjects in the Intellectual group scored significantly lower ($p < .01$) on Factor II, Academic Achievement,

than subjects in the Social, Artistic, and Enterprising groups. This indicates that the academic achievements of Intellectual subjects were greater than those of subjects in the other groups. On Factor XI, School and Cultural Activities, the mean for the Social group was significantly higher ($p < .05$) than those for the Intellectual and Artistic groups; indicating subjects in the Social group participated in fewer activities. The Intellectual group was significantly lower ($p < .01$) than the Social, Artistic, Enterprising, and Conventional groups on Factor XII, Scientific Interest. As with the male subjects, the Intellectuals demonstrated more scientific interest. Conventional subjects scored significantly higher ($p < .05$) than Artistic subjects on Factor XIII, Independence/Dominance. Artistic subjects were more independent than their Conventional counterparts. On the final significant female factor, Factor XIV (Positive Academic Attitude); Intellectual subjects showed a more positive academic attitude than Artistic and Social subjects who scored significantly higher ($p < .05$).

Factor Comparison

A visual comparison of the biodata factors obtained in the present study and those found in the Owens (1971) study indicated that there was a high degree of correspondence among the factors in the two studies. This visual comparison involved looking for sets of items which loaded on a factor in the present study and at the same time loaded on a congruent Owens factor.

Table 10 lists the factors in the Owens study which are congruent to the various factors in the present study. As can be seen from the table, all of the male factors in the present study can be paired with a factor from the Owens study. However, four of the female factors did not have an analog factor in the Owens study. These four female factors did, however, have corresponding male factors from the present study. The five Owens factors which do not have congruent factors in the present study are Cultural-Literary Interests, Conformity to the Female Role, Expression of Negative Emotions, Social Maturity, and Popularity with the Opposite Sex.

The product moment correlation coefficients between the congruent factors are reported in Table 11. Three different coefficients are reported for each factor. These three correlations correspond to the three assumptions made concerning the loadings of the items which loaded on factors

Table 10. Correspondence between Owens' factors and those in the present study

Males		Females	
Present study	Owens study[a]	Present study	Owens study[b]
I	IV	I	II
II	II	II	III
III	VIII	III	V
IV	VII	IV	IV
V	III	V	VII
VI	XII	VI	XV
VI	IX	VII	X
VIII	X	VIII	I
IX	I	IX	-
X	V	X	I
XI	VI	XI	-
XII	XIII	XII	VIII
XIII	XI	XIII	-
		XIV	XIV
		XV	-

[a]See Appendix E for description of Owens' factors.

[b]See Appendix F for description of Owens' factors.

Table 11. Correlations between analog factors under three different item loading assumptions

Males				Females			
Factor pair Eberhardt-Owens	Item loading assumptions .29	-.29	.00	Factor pair Eberhardt-Owens	Item loading assumptions .29	-.29	.00
I-IV	.97	.97	.97	I-II	.62	.89	.84
II-II	.88	.80	.86	II-III	.98	.98	.98
III-VIII	.99	.99	.99	III-V	.98	.98	.98
IV-VII	.94	.99	.98	IV-IV	.98	.98	.98
V-III	.88	.74	.86	V-VII	.53	.34	.40
VI-XII	.99	.99	.99	VI-XV	-.89	-.58	-.69
VII-IX	.29	.12	.16	VII-X	.17	.10	.12
VIII-X	.96	.73	.87	VIII-I	.80	.87	.88
IX-I	.88	.83	.85	IX	-	-	-
X-V	.86	.57	.74	X-I	-.56	-.52	-.56
XI-VI	.19	.19	.19	XI	-	-	-
XII-XIII	.99	.99	.99	XII-VIII	.92	.75	.87
XIII-XI	.95	.63	.81	XIII	-	-	-
				XIV-XIV	.99	.78	.92
				IV	-	-	-

in the present study but not on the analog factors in the Owens study. These item loading assumptions have been described earlier. The results of the statistically based comparisons corroborate those of the visual inspection. Eleven of the thirteen male factor pairs correlated highly with each other. The range of these high correlations for males was from .63 to .99. The average correlations ($\bar{r}$) for males under the three item loading assumptions (.29, -.29, .00) were .83, .73, and .79, respectively. As with the visual inspection, the degree of statistical factor congruence was not as great for the females. Seven of the eleven female factor pairs correlated highly with each other (.62 to .99). The average correlations ($\bar{r}$) for females for the item loading assumptions (.29, -.29, .00) were .52, .51, and .52, respectively. The high degree of factor congruence for the male factors lends evidence to the validity generalization of the Biographical Information Blank's factor structure for males.

DISCUSSION

The results of the present study tend to support the hypothesis that a person's modal personality type or vocational type is shaped, to some extent, by his or her past life history experiences. Both the regression analyses and, to a lesser degree, the analyses of variance provide evidence for this supposition. Also, the second hypothesis, that the factor structure obtained from responses to biodata items in the present study would be similar to structures found previously, was partially supported.

Biodata Determinants of Vocational Typology

The magnitude of the multiple correlation coefficients yielded by the regression of the subjects' individual VPI scale scores on their biodata factor scores provides strong support for the belief that a person's life experiences are a major determinant of the development of one's vocational interests. Previously, it was cautioned that due to the effects of large sample sizes, a statistically significant correlation may have questionable substantive significance. However, in the present study the correlations are of such magnitude (ranging from .32 to .65) to yield not only statistical significance but substantive significance as well.

Squaring these multiple correlation coefficients (R^2) to obtain the percent of variance in the VPI scale scores explained by the biodata factors furnishes even more convincing

evidence for the importance of biodata experiences in determining vocational interests. Anywhere from ten percent up to forty percent (Intellectual scale for females) of the variance in the subjects' vocational interests can be explained by their biodata responses. These percentages are substantially higher than those typically found with other measures, such as personality inventories, which have been related to vocational interests. Though the multiple correlation coefficients for the Conventional scale for both males and females were not statistically significant, they too were of a moderate magnitude (.34 and .32, respectively).

The regression weights which were obtained in the present study also appear to be quite stable as indicated by the small amount of shrinkage resulting from the cross-validation procedure. Considering that the amount of shrinkage which occurs when the beta weights from a regression of one sample are applied to a different sample is a function of the number of independent variables being fitted into the regression model (and sample size), the shrinkage in the present study is relatively low. This is surprising in that all thirteen male biodata factors were entered into the regression equation as were all fifteen female biodata factors.

Before discussing how the results of the one-way analyses of variance also lend credence to the first hypothesis, several points should be made concerning the assignment of

subjects to the six vocational groups. First, only three females could be assigned to the Realistic group. For that reason, there were only five levels of group membership in the analyses of variance for females. Secondly, a preponderance of the females were assigned to the Social (164) and the Artistic (86) groups. These two facts indicate a possible limitation associated with the use of Holland's VPI.

Holland (1973) assumes that the vocational types are measured equally well for males and females. However, there appears to be a controversy in the literature surrounding that assumption (Holland, 1976b; Prediger & Hanson, 1976a, 1976b). It does appear, to the present author, that most of the occupations used for the Realistic (e.g., airplane mechanic, master plumber, power shovel operator, etc.), Intellectual (e.g., meteorologist, aeronautical engineer, zoologist, etc.), and Enterprising (e.g., stocks and bonds salesperson, manufacturer's representative, television producer, etc.) scales may be considered occupations that are traditionally male-dominated. The Social scale, on the other hand, includes many traditional female occupations (e.g., high school teacher, speech therapist, playground director, etc.). Therefore, if Holland's assumption is incorrect, it may be inherently difficult to find approximately equal numbers of individuals for each sex in the six vocational groups.

An additional explanation of the difficulty in the assigning of subjects to the six vocational groups involves the nature of the subject sample utilized. Selecting subjects from a college population would seem to naturally bias any attempt to obtain equal group sizes. Many occupations in both the Realistic and Conventional categories do not require a college education. For that reason it may be difficult to find Realistic and Conventional individuals in a college population.

Finally, it should be recognized that fifty males (13%) and sixty-seven females (15%) could not be unambiguously assigned to any one group as they did not have one scale score which was higher than all the others. Because they could not be assigned to a group, these subjects were dropped from the analyses of variance. Though this is a sizable reduction in data, the author could not justify placing them in one of the groups for which they had one of their high scale scores and not including them in the other(s). One should remain cognizant of these group assignment difficulties when interpreting the results of the analyses of variance.

Though to a lesser degree, the analyses of variance also support the first hypothesis. It was hypothesized that subgroups, defined by subjects' scores on the VPI scales, would differ significantly on factor scores obtained from

the biodata form. Group membership did prove to have a significant effect on five of the thirteen male biodata factors and five of the fifteen female factors. Besides providing evidence for the first hypothesis, these significant findings and their subsequent post hoc comparisons added to the validity of Holland's classification scheme.

Although the purpose of this research was not an attempt to validate Holland's classification scheme, the results of the mean comparisons display consistencies with the theory underlying Holland's scheme. Holland's description of Intellectual and Realistic individuals as having scientific and mechanical abilities is consistent with the finding that these individuals in the male sample displayed greater scientific interest in the past. A similar finding was obtained for the females, but only for the Intellectual group.

Group differences on the Independence/Dominance factors for both males and females also supported Holland's theoretical descriptions of members of the various groups. Conventional individuals, described by Holland as conforming, inhibited,orderly, self-controlled, and unimaginative, were found to have past life experiences exhibiting the least independence or dominance.

Comparisons of several other female and male factors added to the validity of Holland's theory. Intellectual

female subjects demonstrated greater past academic achievements and exhibited a more positive academic attitude than the other subjects. Again, this is consistent with Holland's description of that particular vocational type. Finally, Realistic male subjects participated in the fewest extra-curricular activities. This would be predicted from Holland's description of Realistic individuals as lacking in social ability.

A comparison which did not necessarily relate to the validity of Holland's theory, but which did make intuitive sense, involved the male factor of Athletic Involvement. It was found that subjects in the Intellectual group participated in athletic activities less than subjects in all the other groups; significantly less ($p < .05$) than those in the Enterprising group. This is consistent with the stereotype, though perhaps incorrect stereotype, of students with high academic achievements being very unathletic.

Besides these significant findings supporting Holland's theory, there were also several expected findings which did not result and several findings which did occur which are counter-intuitive. First, it had been expected that there would be mean group differences on the Socioeconomic Status factors for males and females. The basis for this expectation is that past research investigating limited

numbers of demographic variables found significant relationships between social class and vocational interests and preferences (Gribbons & Lohnes, 1969; Kohn, 1969; Bachman, 1970). Perhaps, when sampling a rather homogeneous population such as that at a university, any social class differences tend to be minimal.

Secondly, though there were significant mean differences on the factors of Academic Achievement and Positive Academic Attitude for females, these differences were not found in the male sample. This is surprising given the findings of previous research where intelligence and academic achievement were related to vocational choice and vocational interests (Astin, 1967; Bachman, 1970). Again, the nature of the sample employed could possibly explain the absence of such findings. Given the relatively high entrance requirements of the university at which the subjects were enrolled, a restriction in range of intelligence and past academic achievements is likely. The earlier studies which were cited sampled high school students where intelligence differences would be greater.

Finally, the finding for males that subjects belonging to the Enterprising group had warmer past parental relationships than subjects in the Social group is confusing. One would expect that Social individuals, whom Holland describes as cooperative, friendly, helpful, and understanding, would

be the group with a history exhibiting the warmest parental relationships. This expectation is based on the assumption that the manner in which a child is treated by his parents transfers to relationships the child has with other people. This assumption obviously does not hold in the present study as Enterprising individuals, described by Holland as ambitious, domineering, and talkative, had the history of warmest parental relationships. This is an interesting finding, but any attempt on the author's part to explain it would be mere speculation.

Overall, the analyses of variance provide moderate support for the belief that past experiences play an important role in vocational interest development. Though group membership had a significant effect on only five male and five female biodata factors, the significant differences which did occur were generally consistent with Holland's theory and were readily explainable.

Given the impressive evidence that life experiences, as indexed by a subject's responses to biodata items, play an important role in the development of a person's vocational interests, a question arises of why biodata works so well in predicting vocational interest. There are several possible answers to this question. First, biodata has a relatively distinguished history in industrial/organizational psychological research. One of the virtues of biodata has

been its tendency to be an outstanding predictor of a broad spectrum of external criteria (Ghiselli, 1966).

Besides its impressive empirical history, the success of biodata also has a theoretical basis. One of psychology's most basic measurement axioms is that the best predictor of what a man will do in the future is what he has done in the past. The criterion-related validity of biodata, which directly implements this axiom, is thus quite in accord with expectation.

In the present context, if a student's past life experiences have been characterized by high academic achievement, teachers who aroused their interests, homes filled with books and magazines, and parents who encouraged open discussion of ideas, it would seem natural for the student to develop Intellectual interests. Similar characteristic life experiences could be extended to the other vocational types.

Finally, there is a possible statistical explanation for the success of biodata. The reliability of biodata, compared to other measures such as personality inventories, is extremely high. Because many of the items on a biodata form ask for "factual" data, they are not as susceptible to misinterpretation as many of the ambiguous personality inventory items. Due to the fact that validity is a function of

reliability, biodata would appear to have an inherent statistical advantage over other measures.

Implications of the Biodata - Vocational Interest Relationship for Holland's Theory and Vocational Counseling

One of the major purposes of this study was an attempt to extend Holland's theory to include an explanation of the antecedent variables which lead to the development of a person's vocational interests. In view of the present findings, it is believed that such an extension is possible. As previously noted, a weakness in Holland's theory involves the fact that he does not explicitly state the antecedents which result in, or cause, a person to adopt one personality type or vocational type as his own over the other types. It is now argued that, through the administration of a standardized biodata form, knowledge of these antecedent conditions can be obtained.

Generally, the present study has expanded on the idea behind the studies conducted by Laurent (1951), Kuhlberg and Owens (1960), Albright and Glennon (1961), and others. However, rather than looking at the past experiences of members of a single occupation or a limited number of occupations, this research has investigated the past experiences of members of the particular vocational types or modal personality types hypothesized by Holland. By examination

of the results of regression analyses and analyses of variance conducted on subject's biodata factors, one can organize the histories of individuals belonging to the various vocational types. Through this organization, one can then obtain a more explicit account of the apparent coherence of the various histories and differentiate the life experiences according to their importance in the development of vocational interests. If one then discovers particular patterns of crucial life experiences for the six vocational types, it is a short step to assume that it is these vital experiences which are the antecedent conditions to vocational interest development.

Besides allowing researchers to predict the vocational interests and preferences of individuals, knowledge of a person's past experiences could also be put to a more practical use by vocational counselors. If a vocational counselor had information on the developmental history or past experiences of an individual, he could compare this particular life history to the life histories known to be characteristic of a given vocational type. From this comparison the counselor would be better able to help the client assess the likelihood of satisfaction with his choice of a vocation (Galinsky, 1962). Though the counselor would be unable to pinpoint one specific occupation, he could

suggest a group of possible occupations belonging to a particular vocational group (e.g., Realistic, Intellectual, Social, etc.).

Biodata Factor Correspondence Across Two Samples

Comparisons of the factors found in the present study with those obtained in an earlier study by Owens (1971) provided partial support for the second hypothesis offered earlier. However, before discussing the findings of the factor comparisons, mention should be made of the method or rationale used in extracting factors in the present study.

Owens used the method of principal components to factor analyze biodata item responses. The criterion he employed to determine the number of factors to be extracted and rotated was that each factor had to have an eigenvalue of 1.00 or greater. An attempt was made to use the same criterion for extraction and rotation in the present study. However, this criterion was not feasible in the present study as thirty-one female factors and thirty-two male factors had eigenvalues greater than 1.00. These large numbers of factors were of little value statistically and were substantively meaningless. Therefore, it was decided to rotate the same number of factors as appeared in the Owens study - thirteen male factors and fifteen female factors. Though

this is not a serious departure from the factoring technique used by Owens, the reader should keep in mind when considering the results of the factor comparisons that congruence in this study does not address comparability among the number of extracted factors (as this was forced), but the similarity of the items comprising each factor across the two studies.

The second hypothesis that was tested was that the factor structure obtained in the present study would be similar to structures previously obtained. The basis for this hypothesis was the fact that the two universities from which the two samples were drawn are quite similar in nature. Both universities are science- and engineering-oriented versus an orientation toward the liberal arts. It was assumed that students who choose to enroll in similar universities would have similar interests and backgrounds. This hypothesis was strongly supported by the comparisons of the male factors and, to a lesser degree, by the comparisons of the female factors.

A visual examination of the item loadings of the thirteen male biodata factors in the present study revealed that all of them had an analog in the Owens study. This served as preliminary evidence for the stability of the factor structure. Although this is the commonly used method

of comparing the results of factor analyses performed across different samples, it offers little precision. For that reason a statistical comparison of ostensibly similar factors, utilizing the product moment correlations between the pairs of similar factors, was conducted. Again, the results of the comparisons of the male biodata factors strongly support the second hypothesis. The magnitude of the correlation coefficients ($\bar{r}$ = .79) leaves little doubt as to the stability of the factor structure across the two samples of males. Only two of the factor pairs were not significantly ($p < .001$) correlated.

It is now appropriate to comment on the item loading assumptions which were made in order to complete the correlational analysis of factor congruence. As is probably true of many attempts to compare results across studies, it was difficult to obtain complete data from the Owens study. The factor loadings of items which did not load on a particular Owens factor but did load ($\pm$ .30) on the analog factor in the present study were not available. For that reason the assumptions described previously had to be made concerning the loadings of these items on the factors from the Owens study.

From the results reported in Table 11, several points should be made about the nature of these assumptions. First,

the assumptions that the items loaded either .29 or -.29 appear to set the limits of the range of the correlations assessing factor congruency. On the one hand, an assumption that an item "just missed" loading on a factor in the expected direction is probably a liberal estimation and would bias the obtained correlation coefficients in the direction of greater factor congruence. On the other hand, however, an item loading assumption of -.29, or a loading in the opposite direction, is a very restrictive assumption to make and would lead to an overly conservative estimate of the correlation between the two factors. Following this rationale and from the results reported in Table 11, an assumption that the items in question loaded .00 on the various factors appears to be a reasonable compromise between the two extreme assumptions. Therefore, the findings of the correlational comparisons are discussed in terms of results obtained using an item loading assumption of .00. Keeping this in mind, the results of the comparisons of the female factors will now be discussed.

The degree of support for the factor structure congruence hypothesis was tempered somewhat by the results for the comparisons of the female biodata factors. First, the visual comparison of the factors obtained in the two studies revealed congruence on only eleven out of a possible fifteen

factor pairs. Also, one Owens factor (I, Warmth of Maternal Relationship) served as the analog for two separate factors in the present study (VIII, Warmth of Maternal Relationship and X, Warmth of Paternal Relationship). Due to the inability to find analogs for all of the factors in the present study, correlations were calculated for only eleven factor pairs. The average correlation for the female factor pairs was .52. This average takes into account the fact that two factor pairs which appeared to be similar upon visual inspection actually correlated negatively. However, of the eleven correlations, seven were significant ($p < .001$). Overall, about half of the female factors in the present study had an almost identical factor in the Owens study.

A possible explanation for the partial support of female biodata factor stability could be that the two samples of females differed significantly. It may be that the past experiences of females attending a southern university vary considerably from those attending a midwestern university. However, given the high degree of congruence in the male factors, this explanation does not seem too plausible.

A more plausible explanation involves consideration of the changes in the roles and perceptions of women which have occurred in recent years (Hoffman, 1977; Maccoby & Jacklin, 1974). The data for the Owens study were collected during the late 1960's. Since that time, due to the influence

of the feminist or women's liberation movement, the traditional roles and perceptions of women have been changing. Perhaps these changing roles and perceptions have also led to changing life experiences for females. Certainly, greater numbers of women can be seen selecting academic majors and entering occupations which have traditionally been male dominated. Therefore, it is not unreasonable to assume that the experiences of females have been changing. These changes would affect a female subject's responses to biodata items. This, in turn, would affect the stability of any resulting factor structure.

Support for this explanation can be found by looking at the names of the Owens factors which did not pair with any factor in the present study. Cultural-Literary Interests, Conformity to the Female Role, Expression of Negative Emotions, Social Maturity, and Popularity with the Opposite Sex all can be seen to have associations with the traditional, stereotyped view of women. The fact that such factors did not emerge in the present study may indicate a weakening of these views and stereotypes.

Another piece of evidence in favor of an explanation involving the changing experiences of women is the high degree of correspondence between the male and female factors found in the present study. Whereas Owens found five "female factors" and three "male factors", the same cannot be said

of the current study. All of the male factors appear to have a female analog. In fact, the two additional female factors can be attributed to the bifurcation of two male factors. This greater male-female factor congruence would seem to indicate that the early life history experiences of females and males are becoming more homogeneous.

Implications of the Evidence for Biodata Factor Stability

The overwhelming evidence for biodata factor stability found for males has important implications for those considering adopting Owens' developmental-integrative model for explaining human behavior. Without any indication of factor stability, the practice of considering factors which appeared in a previous study as stable, integrated and meaningful life history variables would be suspect. Without any evidence for factor stability, one could never be confident if the factors which were obtained in a study were generalizable to other samples or unique to that particular sample. The present study extends the validity of the factor structure for males obtained by Owens. Though the results of a single study demonstrating factor congruence across two samples do not ensure total factor stability, they are a step in the direction of validity generalization.

The results of the factor comparison for females and the

explanation offered for the results also have important implications for those considering doing future biodata research. They point to the fact that researchers using standardized biodata forms need to be aware of any changing societal trends which may cause a change in the experiences of a particular group of people. To keep abreast of such changes, periodic analyses of subjects' responses to biodata items should be conducted to examine the continued stability of the factor structure.

Overall, the results indicate that future researchers using the Biographical Information Blank can have more confidence in using the factor structure for males previously reported in the literature. On the other hand, the changing experiences of females would tend to indicate that additional comparative studies are in order to determine the most appropriate factor structure.

Considerations for Future Research

The results of the present study suggest a number of methodological and theoretical considerations for future researchers to address when investigating the relationship between vocational interests and biodata. First, although the degree of relationship between the biodata

factors and the VPI scale scores demonstrated in the present study was substantial, more supportive evidence of this relationship would be desirable.

To obtain this evidence future researchers may wish to employ the methodology suggested by Owens' developmental-integrative model. Using this model, an investigator would first use the technique of cluster analysis to form homogeneous clusters of individuals based on their responses to the biodata items. After the clusters of subjects had been formed, the researcher could then analyze their responses to the VPI to determine if the clusters differed on the modal vocational types. This method varies from the present one in that the present study formed groups of subjects on the basis of subjects' VPI scale scores. The proposed method is closer to that proposed by Owens (1971, 1976) for biodata research. This is not meant to suggest that the method of forming groups used in the present study is in anyway inferior. In fact, given the purpose of extending Holland's theory, it was the preferred method.

Continuing, future investigators utilizing the proposed method could use the results of the present study to analyze the nature of the past experiences of the various clusters of individuals. From knowledge of the groups' past experiences, the researcher could then predict the

modal vocational type for the various groups. This procedure would yield an index of the predictive validity of biodata in determining vocational interest.

Another research study which may be of some interest would be an analysis of the past experiences of those individuals who were not assigned to any of the vocational groups. As reported, a sizeable number of subjects could not be unambiguously assigned to one of the six vocational groups because they did not have one scale score that was higher than all of the others. Research could be conducted treating these individuals as a separate group. It could then be determined if these individuals have characteristic biodata experiences which lead to an uncrystallized pattern of vocational interests.

The results of the biodata factor stability analyses also indicate avenues for future research which appear to be informative and necessary for users of standardized biodata forms. As previously stated, one study supporting the notion of factor stability is not conclusive. The resulting stability in the present study may have been due to the relatively homogeneous nature of the two samples. Perhaps the responses from a relatively different college student population would yield a different factor structure altogether. It may be informative to sample students from a

liberal arts institution or a private university as opposed to the science-oriented and state-supported nature of the two universities considered in this study. Also, the need to periodically analyze the responses to the biodata items to test for any possible changes in relevant life experiences has already been mentioned.

Concluding Remarks

Overall, the results of the study provided support for the two hypotheses which were advanced. With respect to the biodata-vocational interest hypothesis, the findings of the regression analyses provided firm support for the hypothesis as indexed by the percent of variance in VPI scale scores explained by the subjects' biodata factor scores. The results of the one-way analyses of variance, though providing more moderate support, also give evidence for the biodata-vocational interest relationship and at the same time yield evidence for the validity of Holland's theory.

As far as the biodata factor stability hypothesis is concerned, the results provided mixed support. The correlations between congruent factors for males indicate a high degree of factor stability. However, the results of the comparisons of female factors were less supportive. Factors relating to the traditional roles and perceptions of females

failed to emerge in the present study. The changing roles of women in today's society and any consequent changes in biodata experiences were offered as an explanation for those unstable factors.

REFERENCES

Albright, L. E., & Glennon, J. R. Personal history correlates of physical scientists' career aspirations. Journal of Applied Psychology, 1961, 45, 281-284.

Astin, H. S. Career development during the high school years. Journal of Counseling Psychology, 1967, 14, 94-98.

Bachman, J. G. Youth in transition: The impact of family background and intelligence on tenth-grade boys, Vol. II. Ann Arbor, Mich.: Institute for Social Research, 1970.

Baird, L. L. The relation of vocational interests to life goals, self-rating of ability and personality traits, and potential for achievement. Journal of Counseling Psychology, 1970, 17, 233-239.

Barr, A. J., Goodnight, J. H., Sall, J. P., & Helwig, J. T. A user's guide to SAS 76. Raleigh, N.C.: SAS Institute Inc., 1976.

Berdie, R. F. Factors related to vocational interests. Psychological Bulletin, 1944, 41, 137-157.

Blalock, H. M. Jr., Ed. Causal models in the social sciences. Chicago: Aldine, Atherton, 1971.

Bordin, E. S. A theory of vocational interests as dynamic phenomena. Educational and Psychological Measurement, 1943, 3, 49-65.

Bordin, E. S., Nachman, B., & Segal, S. J. An articulated framework for vocational development. Journal of Counseling Psychology, 1963, 10, 107-117.

Bryson, J. B. The dimensions of early human experience. In W. A. Owens (Chrmn.), Developmental implications of biographical data. Symposium presented at the meeting of the Southern Society for Philosophy and Psychology, Miami, April, 1969.

Campbell, D. P., & Holland, J. L. Applying Holland's theory to Strong's data. Journal of Vocational Behavior, 1972, 2, 353-376.

Chaney, F. B., & Owens, W. A. Life history antecedents of sales, research, and general engineering interests. Journal of Applied Psychology, 1964, 48, 101-105.

Dewinne, R. F., Overton, T. D., & Schneider, L. J. Types produce types - Especially fathers. Journal of Vocational Behavior, 1978, 12, 140-144.

Folsom, C. H., Jr. The validity of Holland's theory of vocational choice. Unpublished doctoral dissertation, University of Maine, Orono, 1971.

Gaffey, R. L., & Walsh, W. B. Concurrent validity and Holland's theory. Journal of Vocational Behavior, 1974, 5, 41-51.

Galinsky, D. M. Personality development and vocational choice of clinical psychologists and physicists. Journal of Counseling Psychology, 1962, 9, 299-306.

Ghiselli, E. E. The validity of occupational aptitude tests. New York: Wiley, 1966.

Ginzberg, E. Toward a theory of occupational choice. Occupations, 1952, 30, 491-494.

Grandy, T. G., & Stahmann, R. F. Types produce types: An examination of personality development using Holland's theory. Journal of Vocational Behavior, 1974, 5, 231-239.

Green, L. B., & Parker, H. J. Parental influences upon adolescents' occupational choice: A test of an aspect of Roe's theory. Journal of Counseling Psychology, 1965, 4, 379-383.

Gribbons, W. D. & Lohnes, P. R. Career development from age 13 to 25. Final report, 1969. Project No. 6-2151, Grant No. OEG-1-7-062151-0471. Washington, D.C.: Office of Education.

Hagen, D. Careers and family atmosphere: An empirical test of Roe's theory. Journal of Counseling Psychology, 1960, 7, 251-256.

Harman, H. H. Modern factor analysis. Chicago: The University of Chicago Press, 1967.

Hoffman, L. W. Changes in family roles, socialization, and sex differences. American Psychologist, 1977, 32, 644-657.

Holland, J. L. A personality inventory employing occupational titles. Journal of Applied Psychology, 1958, 42, 336-342.

Holland, J. L. A theory of vocational choice. Journal of Counseling Psychology, 1959, 6, 35-44.

Holland, J. L. Some explorations of a theory of vocational choice: I. One- and two-year longitudinal studies. Psychological Monographs, 1962, 76, 26. (Whole No. 545).

Holland, J. L. Explorations of a theory of vocational choice and achievement: II. A four-year prediction study. Psychological Reports, 1963, 12, 537-594.

Holland, J. L. Explorations of a theory of vocational choice: V. A one-year prediction study. Moravia, N.Y.: Chronicle Guidance Professional Service, 1964.

Holland, J. L. Manual for the vocational preference inventory. Palo Alto, Calif.: Consulting Psychologists Press, 1965.

Holland, J. L. The psychology of vocational choice. Waltham, Mass.: Blaisdell, 1966.

Holland, J. L. Exploration of a theory of vocational choice: VI. A longitudinal study using a sample of typical college students. Journal of Applied Psychology, 1968, 52, 1-37.

Holland, J. L. Making vocational choices: A theory of careers. Englewood Cliffs, N.J.: Prentice-Hall, 1973.

Holland, J. L. Manual for the vocational preference inventory. Palo Alto, Calif.: Consulting Psychologists Press, 1975.

Holland, J. L. Vocational preferences. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand-McNally, 1976. (a)

Holland, J. L. The virtues of the SDS and its associated typology: A response to Prediger and Hanson (1976). Journal of Vocational Behavior, 1976. (b)

Holland, J. L., & Lutz, S. W. Predicting a student's vocational choice. Personnel and Guidance Journal, 1968, 46, 428-436.

Holland, J. L., & Nafziger, D. H. A note about the validity of the Self-Directed Search. Unpublished manuscript, Center for Social Organization of Schools, Johns Hopkins University, 1972.

Hollander, M. A., & Parker, H. J. Occupational stereotypes and needs: Their relationship to vocational choice. Vocational Guidance Quarterly, 1969, 18, 91-98.

Kaiser, H. F. The varimax criterion for analytic rotation in factor analysis. Psychometrika, 1958, 23, 187-200.

Keselman, H. J., & Rogan, J. C. The Tukey multiple comparison test: 1953-1976. Psychological Bulletin, 1977, 84, 1050-1056.

Kirk, R. E. Experimental design: Procedures for the behavioral sciences. Belmont, Calif.: Wadsworth, 1968.

Klimowski, R. J. A biographical data analysis of career patterns in engineering. Journal of Vocational Behavior, 1973, 3, 103-113.

Kohn, M. L. Class and conformity. Homewood, Ill.: Dorsey Press, 1969.

Kohn, M. L., & Schooler, C. Class, occupation, and orientation. American Sociological Review, 1969, 34, 659-678.

Kuhlberg, G. E., & Owens, W. A. Some life history antecedents of engineering interests. Journal of Educational Psychology, 1960, 51, 26-31.

Lacey, D. Holland's vocational models: A study of work groups and need satisfaction. Journal of Vocational Behavior, 1971, 1, 105-122.

Laurent, H. A study of the developmental backgrounds of men to determine by means of the biographical information blank the relationship between factors in their early background and their choice of professions. Unpublished doctoral dissertation, Western Reserve University, 1951.

Lee, D. L., & Hedahl, B. Holland's personality types applied to the SVIB basic interest scales. Journal of Vocational Behavior, 1973, 3, 61-68.

Maccoby, E. E. & Jacklin, C. N. The psychology of sex differences. Stanford, Calif.: Stanford University Press, 1974.

Marx, M. H. Observation, discovery, confirmation, and theory building. In A. R. Gilgen (Ed.), Contemporary scientific psychology. New York: Academic Press, 1970.

Medvene, A. M. Occupational choice of graduate students in psychology as a function of early parent-child interactions. Journal of Counseling Psychology, 1969, 16, 385-389.

Morrison, R. F. A multivariate model for the occupational placement decision. Journal of Applied Psychology, 1977, 62, 271-277.

Mosier, C. I. Problems and designs of cross-validation. Educational and Psychological Measurement, 1951, 11, 5-11.

Nachman, B. Childhood experience and vocational choice in law, dentistry, and social work. Journal of Counseling Psychology, 1960, 7, 243-250.

O'Dowd, D. D., & Beardslee, D. C. College student images of a selected group of professions and occupations. USOE, Cooperative Research No. 562 (8142). Middletown, Conn.: Wesleyan University, 1960.

O'Dowd, D. D., & Beardslee, D. C. Development and consistency of student images of occupations. Cooperative Research Project No. 5-0858. Rochester, Mich.: Oakland University, 1967.

Osipow, S. H. Theories of career development, 2nd ed. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1973.

Osipow, S. H., Ashby, J. D., & Wall, H. W. Personality types and vocational choice: A test of Holland's theory. Personnel and Guidance Journal, 1966, 45, 37-42.

Owens, W. A. Toward one discipline of scientific psychology. American Psychologist, 1968, 23, 782-785.

Owens, W. A. A quasi-actuarial basis for individual assessment. American Psychologist, 1971, 26, 992-999.

Owens, W. A. Background data. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology. Chicago: Rand-McNally, 1976.

Prediger, D. J., & Hanson, G. R. Holland's theory of careers applied to men and women: Analysis of implicit assumptions. Journal of Vocational Behavior, 1976, 8, 167-184. (a)

Prediger, D. J., & Hanson, G. R. A theory of careers encounters sex: Reply to Holland (1976). Journal of Vocational Behavior, 1976, 8, 359-366. (b)

Rezler, A. G. The joint use of the Kuder Preference Record and the Holland Vocational Preference Inventory in the vocational assessment of high school girls. Psychology in the Schools, 1967, 4, 82-84.

Roe, A. The psychology of occupations. New York: Wiley, 1956.

Roe, A. Early determinants of vocational choice. Journal of Counseling Psychology, 1957, 4, 212-217.

Roe, A., & Siegelman, M. The origin of interests. Washington, D.C.: American Personnel and Guidance Association, 1964.

Schoenfeldt, L. A. Life experience subgroups as moderators in the prediction of educational criteria. Paper read before the American Educational Research Association, Minneapolis, 1970. (a)

Schoenfeldt, L. A. Non-test variables in the prediction of educational progress. In E. E. Dudek (Chrmn.), Use of non-test variables in admission, selection, and classification operations. Symposium presented at the meeting of the American Psychological Association, Miami, September, 1970. (b)

Schoenfeldt, L. A. Utilization of manpower: Development and evaluation of an assessment-classification model for matching individuals with jobs. Journal of Applied Psychology, 1974, 59, 583-595.

Schutz, R. A., & Blocher, D. H. Self-concepts and stereotypes of vocational preferences. Vocational Guidance Quarterly, 1960, 8, 241-244.

Super, D. E. The psychology of careers. New York: Harper & Row, 1957.

Switzer, D. K., Grigg, A. E., Miller, J. S., & Young, R. K. Early experiences and occupational choice: A test of Roe's hypothesis. Journal of Counseling Psychology, 1962, 9, 45-48.

Utton, A. C. Recalled parent-child relations as determinants of vocational choice. Journal of Counseling Psychology, 1962, 9, 49-53.

Werts, C. E. Paternal influence on career choice. Journal of Counseling Psychology, 1968, 15, 48-52.

Williams, C. M. Occupational choice of male graduate students as related to values and personality: A test of Holland's theory. Journal of Vocational Behavior, 1972, 2, 39-46.

APPENDIX A:

DESCRIPTION OF PERSONALITY TYPES

(From Holland, 1973)

Type	Personality
Realistic	Has mechanical ability and lacks social ability; values concrete things, power, money, status. Is social, conforming, frank, materialistic, practical, stable, and uninsightful
Intellectual	Has mathematical and scientific ability and lacks leadership ability; values science. Is analytical, cautious, critical, independent, methodical, rational, reserved, and unpopular
Artistic	Has artistic and musical ability; values aesthetic qualities. Is complicated, disorderly, emotional, impulsive, nonconforming, and original
Social	Understands others and has teaching ability; values social and ethical activities and problems. Is cooperative, friendly, helpful, insightful, responsible, tactful, and understanding
Enterprising	Has leadership and persuasive abilities and lacks scientific ability; values political and economic achievement. Is acquisitive, ambitious, domineering, energetic, optimistic, self-confident, and talkative
Conventional	Has clerical and numerical ability; values business and economic achievement. Is conforming, conscientious, inflexible, inhibited, orderly, practical, self-controlled, and unimaginative

APPENDIX B:

DESCRIPTION OF ENVIRONMENTAL MODELS

(From Holland, 1973)

Type	Model
Realistic	Fosters technical competencies and achievements, and manipulation of objects, machines, or animals; rewards the display of such values as money, power, and possessions. Encourages people to see the world in simple, tangible, and traditional terms
Intellectual	Fosters scientific competencies and achievements and observation and systematic investigation of phenomena; rewards the display of scientific values. Encourages people to see the world in complex, abstract, independent, and original ways
Artistic	Fosters artistic competencies and achievements and ambiguous, free or unsystematized work; rewards display of artistic values. Encourages people to see the world in complex, independent, unconventional, and flexible ways
Social	Fosters interpersonal competencies, and informing, training, curing, or enlightening others; rewards the display of social or humanitarian values. Encourages people to see the world in flexible ways
Enterprising	Fosters persuasive and leadership competencies or achievements and the manipulation of others for personal or organizational goals; rewards the display of enterprising values and goals such as money, power, and status. Encourages people to see the world in terms of power, status, responsibility, and in stereotyped and simple terms

Description of Environmental Models (Continued):

Type	Model
Conventional	Fosters conformity and clerical competencies and explicit manipulation of data, records, or written material; rewards the display of such values as money, dependability; conformity. Encourages people to see the world in conventional, stereotyped, constructed, simple, and dependent ways

APPENDIX C:

VOCATIONAL PREFERENCE INVENTORY

(From Holland, 1965)

Copies of the Vocational Preference Inventory may be obtained from Consulting Psychologists Press, Palo Alto, California.

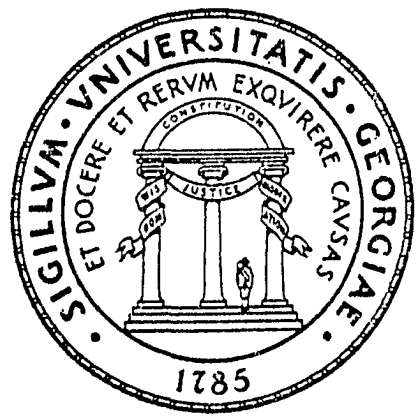
APPENDIX D:

BIOGRAPHICAL INFORMATION BLANK

(From Owens, 1971)

UGA

BIOGRAPHICAL QUESTIONNAIRE



Measurement & Human Differences Program
Department of Psychology

Directions

Please take your answer sheet out of your booklet. Print your name, last name first, in the space provided (upper left portion of the answer sheet). Also fill in the information requested in the other sections of this line.

On the second line indicate your school (Arts & Sciences, Education, Business, etc.) in the space provided and your major in the section marked city. Also indicate your class (freshman, sophomore, etc.) in the appropriate space.

In the identification number section print your student I. D. number in the column of boxes. Then in each row, blacken the space corresponding to the number in the box at the left. If your I. D. has an initial letter, blacken 1 for A, 2 for B, 3 for C, 4 for D, 5 for E, etc. If you do not know your student I. D. number, leave the space blank.

There are 118 questions in this booklet. Answer the questions in order by blackening the space in the appropriate row of the answer sheet (A, B, C, D, or E). Do not mark on the test booklet. Please use a medium hard pencil; don't use a pen because the scoring equipment cannot read ink.

As you read the items, check occasionally to be sure that the question number in the booklet corresponds to the response number on the answer sheet.

Bear in mind that there are no right or wrong answers; just select the option that best represents your own background, opinion or feeling. Although there is no time limit, you are urged to work at a fairly rapid rate. Previous experience has shown that your initial impression is the most representative one.

All the items which follow are in the familiar multiple choice format. Answer each one by blackening the circle in the appropriate column (A,B,C,D, or E) on your answer sheet.

For the following blacken

A = very often
B = often
C = sometimes
D = seldom
E = never

1. In high school, how often did you discuss intimate and/or important matters with your father?
2. In high school, how often did your parents criticize you?
3. In high school, how often were your parents angry with you?
4. In the last few years, how often have you had a desire to be alone, to pursue your own interests and thoughts?
5. In high school, how often did you really disagree with your parents?
6. How often have you set difficult goals for yourself which you still attempt to reach?
7. How often have you felt downcast and dejected?
8. In high school, how often do you think you were regarded as radical or unconventional?
9. How often did the rules of conduct in your home anger or frustrate you?
10. In high school, how often did you tend to guide or direct others in group activities?
11. How often have you suffered "attacks of conscience" when you felt that you had done wrong by society's standards?
12. During high school when you wanted to "take it out" on someone, how often did you choose parents?
13. During high school when you wanted to "take it out" on someone, how often did you choose friends or acquaintances?

For the following blacken

A = very much
B = much
C = some
D = little
E = very little

14. How interested were your parents in activities in which you engaged?
15. How much have you liked school?

A = very much
B = much
C = some
D = little
E = very little

16. In comparison with others in your high school classes, how much did you question your teacher on subject matter?

17. In general, how much did you like your high school teachers?

18. In high school, how much did you enjoy lecture classes?

19. In high school, how much did you enjoy discussion courses?

20. In high school, how much did you enjoy laboratory courses?

21. How much freedom or independence did your parents allow you in grade school (e.g., in the way you spent your time, spent your money, in your choice of friends, etc.)?

22. How much freedom or independence did your parents allow you in high school (e.g., in the way you spent your time, spent your money, in your choice of friends, etc.)?

23. During high school, how much did you try to become like one of your parents?

24. During high school, how much did you try to become like a friend?

25. During high school, how much did you wish you could become more socially acceptable?

26. During high school, how much did you wish you could become more powerful?

For the following blacken

A = great extent
B = large extent
C = moderate extent
D = slight extent
E = not at all

27. To what extent have you tried to be like your father?

28. To what extent has it been typical of you to daydream a good deal of the time?

29. In a group discussion, to what extent have you tended to try to make others see your point of view?

30. To what extent did you feel self-conscious during your high school years?

31. To what extent were your high school classmates bored by you?

The options for the following items are lettered (A,B,C,D,E) to correspond with the columns on your answer sheet. Simply blacken the space under the appropriate column.

32. How many summers have you attended a summer camp of some sort?
A. 0
B. 1
C. 2
D. 3
E. 4 or more

33. Relative to your friends, how much time did you spend with your father during high school?
A. much more than my friends
B. more than my friends
C. about the same as my friends
D. less than my friends
E. much less than my friends

34. Compared to your friends, how much independence do you feel your parents allowed you while in high school?
A. much more than my friends
B. more than my friends
C. about the same as my friends
D. less than my friends
E. much less than my friends

35. While you were growing up, how much friction was there in your family among the children?
A. very much
B. much
C. some
D. little
E. very little (or had no brothers and sisters)

36. In high school, when you were a member of a small group, how much did you participate?
A. much more than others in the group
B. more than others in the group
C. about the same as others in the group
D. somewhat less than others in the group
E. much less than others in the group

37. To what extent were you independent of others during high school?
A. much more than my classmates
B. more than my classmates
C. about the same as my classmates
D. less than my classmates
E. much less than my classmates

38. How sensitive have you been to criticism?
A. much more sensitive than most
B. more sensitive than most
C. about as sensitive as most
D. less sensitive than most
E. much less sensitive than most

39. In high school, how often did you expect to be successful in academic tasks?
A. always
B. very often
C. often
D. sometimes
E. seldom

40. When you were growing up, about how many books were around the house?
A. a large library
B. several bookcases full
C. one bookcase full
D. a shelf full
E. very few or none

41. Before you came to college, how many magazines were subscribed to or bought regularly from news stands, by your parents?
A. 0
B. 1 or 2
C. 3 or 4
D. 5 or 6
E. 7 or more

42. In high school my parents were
A. very strict
B. strict
C. about average
D. lenient
E. very lenient

43. What is the strength of your religious belief?
   A. much stronger than that of most people my age
   B. somewhat stronger than that of most people my age
   C. about as strong as that of most people my age
   D. somewhat weaker than that of most people my age
   E. much weaker, or no religious belief

44. Religion in my home was considered as
   A. the most important factor in our family life
   B. an integral part of our family life
   C. one of several important factors in our family life
   D. a somewhat unimportant factor in our family life.
   E. a very unimportant factor in our family life

45. What would you guess was your family's average, annual net income during your last two years of high school?
   A. $0 - $6,999
   B. $7,000 - $12,999
   C. $13,000 - $16,999
   D. $17,000 - $24,999
   E. $25,000 or more

46. How much education did your father have?
   A. did not complete high school
   B. high school degree
   C. some college, or business school training
   D. graduated from college
   E. graduate or professional degree

47. How much education did your mother have?
   A. did not complete high school
   B. high school degree
   C. some college, or business school training
   D. graduated from college
   E. graduate or professional degree

48. How would you classify your father's occupation?
   A. professional
   B. managerial or semi-professional
   C. retail business, sales, or rural owner
   D. skilled trades or clerical
   E. semi-skilled or unskilled labor

49. To approximately how many clubs, social and professional organizations did your mother belong?
   A. 0
   B. 1
   C. 2
   D. 3 or 4
   E. 5 or more

50. To approximately how many clubs, social and professional organizations did your father belong?
   A. 0
   B. 1
   C. 2
   D. 3 or 4
   E. 5 or more

51. With what social class do you associate your parents?
   A. upper class
   B. upper middle class
   C. middle class
   D. lower middle class
   E. lower class

52. To what extent were the rules of conduct in your family home modified by "common sense" and the circumstances?
   A. Rules were always applied sensibly and flexibly.
   B. Rules were usually applied sensibly and flexibly.
   C. Rules were occasionally applied sensibly and flexibly.
   D. Rules were usually applied rigidly and inflexibly.
   E. Rules were always applied rigidly and inflexibly.

53. When you were growing up, how much attention did your father give you?
A. a great deal
B. much
C. some, or don't remember father
D. little
E. very little

54. How did your parents feel about your grades in high school?
A. always satisfied
B. usually satisfied
C. neither satisfied nor dissatisfied
D. usually dissatisfied
E. almost always dissatisfied

55. How do you feel about the achievements of your parents?
A. superior to those of most parents
B. superior to those of many parents
C. equal to those of most parents
D. almost as good as those of most parents
E. not as good as those of most parents

56. How often did you argue or fight with your brothers or sisters during your grade school years?
A. very often
B. often
C. sometimes
D. seldom
E. never, or have no brothers or sisters

57. How much of a feeling of competition was there between you and your brothers and/or sisters?
A. very much
B. much
C. little
D. very little
E. none--or had no brothers and/or sisters

58. During high school, how many close female friends did you have?
A. none
B. 1
C. 2 or 3
D. 4 to 6
E. 7 or more

59. Compared to other people in your high school, how many casual friends did you have?
A. more than most
B. a few more than most
C. about the same number as most
D. a few less than most
E. a lot less than most

60. While in high school, how many of the following positions did you hold?
chairman of an important student committee
cheer leader
class officer
editor of a publication
leading actor in a play
member of the student council
member of the debating team
president of an honorary scholastic organization
speaker at the class commencement
captain of an athletic team
president of a student club
A. 0 to 2
B. 3 or 4
C. 5 or 6
D. 7 or 8
E. 9 to 11

61. On the average, how many hours per week of home work did you do in high school?
A. none
B. 1 to 5
C. 6 to 12
D. 13 to 19
E. 20 or above

62. How adequate do you feel your high school education was?
A. very adequate
B. adequate
C. average
D. somewhat inadequate
E. very inadequate

63. During your high school years (grades 9-12) how many times did you make the semester honor roll?
A. never
B. once or twice
C. three or four times
D. five or six times
E. seven or eight times

64. What was your approximate standing in your high school class?
A. below the average
B. about average
C. above average, but not in the upper 25%
D. in the upper 25%, but not in the upper 10%
E. in the upper 10%

65. During your youth when teams were being chosen for games, when were you usually picked?
A. I was usually one of those doing the choosing
B. near the first
C. around the middle
D. near the end
E. never played games

66. In the past, how effectively do you feel that you have met the demands of the social situations?
A. extremely effectively
B. very effectively
C. moderately effectively
D. not very effectively
E. not at all effectively

67. How would you rate your past performance in physical activities?
A. excellent
B. very good
C. average
D. fair
E. poor

68. In high school, how close were you to your mother?
A. extremely close
B. quite close
C. moderately close
D. not very close
E. not close at all; or deceased for more than 10 years

69. In high school, how close were you to your father?
A. extremely close
B. quite close
C. moderately close
D. not very close
E. not close at all; or deceased for more than 10 years

70. In academic situations how competitive were you in high school?
A. extremely competitive
B. very competitive
C. somewhat competitive
D. slightly competitive
E. not at all competitive

71. In high school, when friends came to you with their personal problems, how likely were you to go out of your way to give them help or advice?
A. much more likely than most people
B. somewhat more likely than most people
C. about as likely as others
D. somewhat less likely than most people
E. a good bit less likely than most people

72. Which <u>one</u> of the following do you think is closest to describing your personality?
A. difficult to really get to know
B. have a few really close friends and a number of acquaintances
C. find it extremely difficult to describe myself
D. friendly and easy-going; have a lot of friends
E. very jolly; the "life-of-the-party" type

73. During high school, or before, did you ever conduct a scientific experiment on your own initiative (not as part of any required school assignment)?
A. yes--both before and in high school
B. yes--before high school
C. yes--in high school
D. no

74. Did you ever build an apparatus or device of your own design on <u>your own initiative</u> and not as part of any required school assignment?
A. yes--both before and in high school
B. yes--before high school
C. yes--in high school
D. no

75. How often did your high school teachers stress the importance of students thinking for themselves and applying the knowledge they acquired?
A. almost always
B. very often
C. often
D. sometimes
E. seldom

76. Relative to others in your high school, how popular were you?
A. much more popular than others
B. more popular than others
C. about as popular as others
D. slightly less popular than others
E. less popular than others

77. Relative to your close friends, how well did you do in physical or athletic activities?
A. much better than they did
B. somewhat better than they did
C. about as well as they did
D. not quite as well as they did
E. not nearly as well as they did

78. On the average, how often did you go to church during high school?
A. much more often than others my age
B. more often than others my age
C. about as often as others my age
D. a little less often than others my age
E. a lot less often than others my age

79. On the average, how many times per month did you go on dates during high school?
A. not at all
B. once per month
C. 2 to 4 times
D. 5 to 7 times
E. 8 or more times

80. How many younger brothers or sisters do you have?
A. 0
B. 1
C. 2
D. 3
E. 4 or more

81. On the average, how many times per month did you go to parties in high school?
A. not at all
B. once per month
C. twice per month
D. three times per month
E. four or more times per month

82. How much younger than you is your nearest younger brother or sister?
A. less than 2 years
B. 2 to 3 years
C. 3 to 6 years
D. 6 or more years
E. have no younger brothers or sisters

83. When you were in high school, how often did your parents punish you by taking away privileges?
A. very often
B. often
C. sometimes
D. seldom
E. never

84. How successful were your teachers in arousing your academic interests?
A. extremely successful
B. very successful
C. moderately successful
D. somewhat successful
E. not at all successful

85. Compared with other students in your high school, how much did you try to achieve to the limits of your abilities?
A. much more than other students
B. more than other students
C. about the same as other students
D. less than other students
E. much less than other students

86. In high school, how often did your mother provide you with emotional support and show interest in you as a person?
A. much more often than other mothers seemed to
B. more often than other mothers seemed to
C. about as often as other mothers seemed to
D. less often than other mothers seemed to
E. much less often than other mothers seemed to

87. About how much of your college education have you planned to finance from academic scholarships?
A. all of it
B. three-quarters of it
C. half of it
D. one-quarter of it or less
E. none of it

88. How likely were your parents to give you affection, praise, and attention when you had done something well?
A. much more than most parents
B. more than most parents
C. about as much as most parents
D. somewhat less than most parents
E. less than most parents

89. How well do you think you did in physical sciences relative to other students with about the same ability at your high school?
A. much better
B. somewhat better
C. about the same; didn't take subject; don't know
D. a little less well
E. much less well

90. How well do you think you did in biological sciences relative to other students with about the same ability at your high school?
A. much better
B. somewhat better
C. about the same; didn't take subject; don't know
D. a little less well
E. much less well

91. How difficult were physical science subjects for you?
A. extremely difficult
B. rather difficult
C. moderately difficult, or did not take
D. reasonably easy
E. very easy

92. How difficult were biological science subjects for you?
A. extremely difficult
B. rather difficult
C. moderately difficult, or did not take
D. reasonably easy
E. very easy

93. How old were you when you started dating regularly?
A. never have done this
B. older than 17 years
C. 15 to 17 years old
D. 13 to 15 years old
E. younger than 13

94. During high school, how much did you say what you felt?
A. very much
B. much
C. some
D. little
E. very little

The second major type of item in this booklet is illustrated below. Here you are to respond to each of the numbered activities by selecting one of the lettered options. Again, this is done by blackening the circle in the appropriate column on your answer sheet. The key here is the number. Any word, phrase, or sentence with a separate number is an item and should receive a response.

Example

During your high school career, how much did you enjoy each of the following?

166. Sports
167. Dancing
168. Debate
169. Singing

A. very much
B. much
C. some
D. a little
E. very little

If you enjoyed sports very much in high school, you would blacken Option A, Item 166, on the answer sheet. If you enjoyed dancing some you would blacken Option C, Item 167, on the answer sheet. Items 168 and 169 would be answered in the same manner.

Be sure to start this second section with Item 95.

For the following blacken

A = very much
B = much
C = some
D = little
E = very little

In high school how much did you enjoy courses in each of the following areas?

95. Sciences
96. History
97. Physical Education

For the following blacken

A = very often
B = often
C = sometimes
D = seldom
E = never

How often have you done or engaged in each of the following in the past four years?

98. Building cabinets, furniture models, metal products, etc.
99. Repairing electrical or mechanical devices or machines
100. Individual sports--golf, tennis, hunting, etc.
101. Team sports--football, baseball, basketball, etc.
102. Working with scientific equipment or apparatus

During high school how often did you watch each of the following types of television programs?

103. Operas, symphonies, concerts, or educational features
104. Sports events

When you were a child, how often did your father do each of the following?

105. Nag or push you for better achievements

For the items which follow, the options are lettered (A,B,C,D,E) to correspond with the columns on your answer sheet. Simply blacken the space under the appropriate column.

What was your average grade in each of the following areas in high school?

106. Physical sciences
107. Biological sciences
108. English
109. History, Economics, Government

A. about "A"
B. about "A-" to B+"
C. about "B" or "B-"
D. about "C+" or "C"
E. "C-" or less

How active have you been in any one or more of the following organizations or activities?

110. School newspaper, magazine, or annual
111. School subject matter clubs, such as science, mathematics, etc.
112. Hobby clubs, photography, hot rod, crafts
113. Church, religious or charitable
114. Political clubs or student council
115. Athletics

A. extremely active
B. very active
C. somewhat active
D. slightly active
E. inactive or not a member

How often do you read the following magazines?

116. Fortune or Business Magazine
117. Harpers Atlantic, or other literary magazines
118. Sports and outdoor magazines

A. regularly
B. quite often
C. occasionally
D. very rarely
E. never

APPENDIX E

Description of Male Biographical Factors in Terms of High Scoring Individuals for the Owens (1971) Study:

	Factor	% Variance Explained
1	Warmth of Parental Relationship Had a close, warm relationship with both parents, parents were very likely to give affection, praise and attention, wanted to imitate and be like the father	3.5
2	Academic Achievement High standing in high school class; often on the semester honor roll; very competitive and successful in academic situations	3.1
3	Social Introversion Compared to others in high school: fewer casual friends, fewer dates, less popular, more self-conscious and ineffective in meeting demands of social situations	3.1
4	Athletic Interest Very active in athletic activities; often engaged in team sports; enjoyed physical education courses; rated past performances in physical activities very high	2.3
5	Pseudointellectualism Regularly read literary, business, or scientific magazines; watched educational and cultural TV shows	2.3
6	Aggressiveness/Independence (Verbal) Enjoyed discussion courses, and tended to try to make others see their point of view, questioned teachers on subject matter a lot; were often regarded as radical or unconventional; often wanted to be alone to pursue own thoughts and interests	2.2

Description of Male Biographical Factors in Terms of High Scoring Individuals for the Owens (1971) Study: (Continued)

	Factor	% Variance Explained
7	Socioeconomic Status High parental educational level, average family income, and father's occupational status is high	2.1
8	Parental Control vs. Freedom (bipolar) Parents were more strict, critical, or punitive; anger was more often shown by or at parents; were allowed much less freedom or independence	2.0
9	Positive Adjustment Response Bias Rarely wished to become more socially acceptable; less often chose parents or friends as someone to "take things out" on; less often felt downcast, dejected or self-conscious; not typical to daydream	1.9
10	Scientific Interest Enjoyed science and lab courses, and found them relatively easy; worked with scientific apparatus and equipment, often outside of any required school assignment	1.8
11	Positive Academic Attitude Liked school and teachers very much; teachers were more successful in arousing academic interests; enjoyed specific courses more; did more hours of homework	1.5
12	Religious Activity Very active in church, religious, or charitable organizations; compared to others of the same age, more often went to church, and had stronger religious beliefs	1.3
13	Sibling Friction More often argued or fought with siblings; had more younger brothers and sisters, close to their own age; more friction and competition	1.1
	TOTAL VARIANCE EXPLAINED	28.2

APPENDIX F

Description of Female Biographical Factors in Terms of High Scoring Individuals for the Owens (1971) Study:

	Factor	% Variance Explained
1	Warmth of Maternal Relationship In high school, were very close to the mother; mother more often provided emotional support and interest; more often discussed intimate and/or important matters with mother	4.3
2	Social Leadership More often tended to guide or direct others in group activities; participated in school politics; held more leadership positions in high school	3.2
3	Academic Achievement High grades; very high standing in high school class; more competitive in academic situations; more often expected to be successful in academic tasks	3.1
4	Socioeconomic Status High educational and occupational level of father, high family income and social class	2.6
5	Parental Control vs. Freedom (bipolar) Parents were more strict, and allowed less freedom or independence, and were more punitive by taking away privileges	2.4
6	Cultural-Literary Interests Regularly read national news magazines; did much more nonrequired reading; often watched TV news programs and special reports	2.0
7	Athletic Participation Rated past performance in physical activities very high, very active in athletic activities; more often engaged in individual and team sports, enjoyed physical education courses	1.9

	Factor	% Variance Explained
8	Scientific-Artistic Interests Enjoyed courses in the sciences, music or art, more often worked with scientific equipment or apparatus; physical and biological science subjects; active in dramatic, art, or music groups	1.8
9	Conformity to Female Role More often suffered "attacks of conscience" when they felt they had done wrong by the standards of society, the church, or parents; more often wished to become more socially acceptable, or better prepared as a responsible family member	1.8
10	Maladjustment Often typically felt downcast and dejected, felt so upset that they brooded over the meaning of life; daydreamed to a greater extent; were more sensitive to criticism	1.8
11	Expression of Negative Emotions Very often openly expressed anger with a close friend; very often tried to get even when someone close hurt or upset them; more often wanted to "take things out" on friends	1.7
12	Social Maturity More likely to give help or advice to friends with personal problems; enjoyed complete freedom to work as they pleased in class projects or tasks; were respected by classmates	1.6
13	Popularity with the Opposite Sex More often went on dates; started dating regularly and started going steady at younger age	1.6
14	Positive Academic Attitude Teachers were more successful in arousing academic interests, and allowed much class participation and discussion; liked high school teachers to a greater degree; felt high school education was adequate	1.5

	Factor	% Variance Explained
15	Daddy's Girl Were very close to the father, and spent relatively more time with him, father provided emotional support, interest, and gave more attention	1.3
	TOTAL VARIANCE EXPLAINED	32.6

APPENDIX G

Table G1. Tukey's WSD tests for male biodata factor I (differences between means)

	I	A	R	S	C	E
I	-	.22	.79	2.17	2.92	3.65*
A		-	.57	1.95	2.70	3.43
R			-	1.38	2.13	2.86
S				-	.75	1.48
C					-	.73
E						-

*p<.05.

Table G2. Tukey's WSD tests for male biodata factor VIII (differences between means)

	E	A	C	S	R	I
E	-	.40	.55	.79	4.84**	7.63**
A		-	.15	.39	4.44*	7.23**
C			-	.22	4.29*	7.08**
S				-	4.05*	6.84**
R					-	2.79
I						-

*p<.05.

**p<.01.

Table G3. Tukey's WSD tests for male biodata factor IX (differences between means)

	S	A	R	I	C	E
S	-	.86	1.40	1.69	3.08	3.67*
A		-	.54	.83	2.22	2.81
R			-	.29	1.68	2.27
I				-	1.39	1.98
C					-	.59
E						-

*p<.05.

Table G4. Tukey's WSD tests for male biodata factor X (differences between means)

	R	C	I	E	S	A
R	-	.54	1.41	2.55	2.67	3.24*
C		-	.87	2.01	2.13	2.70
I			-	1.14	1.26	1.83
E				-	.12	.69
S					-	.57
A						-

*p<.05.

Table G5. Tukey's tests for male biodata factor XI (differences between means)

	C	E	R	S	I	A
C	-	1.79	2.13	2.87*	3.51**	3.99**
E		-	.34	1.08	1.72	2.20
R			-	.74	1.38	1.86
S				-	.64	1.12
I					-	.48
A						-

*p<.05.

**p<.01.

APPENDIX H

Table H1. Tukey's WSD tests for female biodata factor II (differences between means)

	S	A	E	C	I
S	-	.82	1.11	3.56	6.40**
A		-	.29	2.74	5.58**
E			-	2.45	5.29**
C				-	2.84
I					-

**p<.01.

Table H2. Tukey's WSD tests for female biodata factor XI (differences between means)

	S	E	C	A	I
S	-	.48	1.31	2.44*	2.70*
E		-	.83	1.96	2.22
C			-	1.13	1.39
A				-	.26
I					-

*p<.05.

Table H3. Tukey's WSD tests for female biodata factor XII (differences between means)

	S	A	E	C	I
S	-	.93	.96	2.31	10.60**
A		-	.03	1.38	9.67**
E			-	1.35	9.64**
C				-	8.29**
I					-

**p<.01.

Table H4. Tukey's WSD tests for female biodata factor XIII (differences between means)

	C	S	E	I	A
C	-	1.62	1.65	2.90	3.00*
S		-	.03	1.28	1.38
E			-	1.25	1.35
I				-	.10
A					-

*p<.05.

Table H5. Tukey's WSD tests for female biodata factor XIV (differences between means)

	A	S	E	C	I
A	-	.91	1.21	1.35	3.59**
S		-	.30	.44	2.68*
E			-	.14	2.38
C				-	2.24
I					-

*p<.05.

**p<.01.

APPENDIX I

Table I1. Biodata factor - VPI scale score correlations for males

Factor	R	I	S	C	E	A
I	.06	.04	-.23	-.13	-.13	.05
II	.09	-.23	-.07	.09	.18	.05
III	-.04	-.02	-.01	.12	.09	.01
IV	.08	-.03	.01	-.01	-.07	- 02
V	.12	.03	-.21	-.11	-.16	-.08
VI	.05	.17	-.12	-.06	-.06	-.02
VII	-.10	.06	-.13	-.03	-.04	-.10
VIII	-.24	-.41	.14	.13	.32	.15
IX	.04	.02	-.04	-.20	-.16	.02
X	.12	-.10	-.17	.02	-.06	-.19
XI	.06	-.22	-.17	.15	.06	-.21
XII	-.02	-.02	-.04	-.02	.07	-.03
XIII	.12	-.21	-.20	.02	-.01	-.12

Table I2. Biodata factor - VPI scale score correlations for females

Factor	R	I	S	C	E	A
I	.07	.07	-.16	-.05	-.33	-.17
II	.00	-.25	.08	-.16	.07	-.07
III	.10	.15	.10	-.07	-.03	-.04
IV	.02	-.01	.00	-.03	-.09	-.14
V	-.19	.06	-.07	-.02	-.10	.02
VI	.05	-.03	-.20	-.07	.04	-.03
VII	-.14	-.09	-.19	-.05	.00	-.03
VIII	.00	-.02	-.07	-.15	.02	.09
IX	-.04	-.06	.04	-.03	-.11	-.11
X	-.10	.01	-.06	-.13	-.04	.08
XI	-.08	-.18	-.09	-.10	-.09	-.20
XII	-.18	-.54	.11	-.09	.15	-.02
XIII	-.01	-.11	-.14	.04	-.12	-.26
XIV	-.03	-.16	-.03	-.07	-.02	-.03
VX	-.04	.10	.01	-.13	.04	-.01